

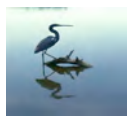
# **Appendix E**

**To conserve paper, Appendix E is included  
on the enclosed CD rather than printed in this hardcopy.**

**Data Gap #2ABC**  
**2017 Water Samples (ARI)**



## QA/QC Solutions, LLC



James J. Mc Ateer, Jr., Managing Member  
7532 Champion Hill Rd. SE  
Salem, Oregon 97306  
Telephone: 503.763.6948  
Facsimile: 503.566.2114  
Cellular: 503.881.1501  
email: jjmcateer@msn.com

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January 26, 2018

Troy Bussey Jr., P.E.  
PIONEER Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, Washington 98503

Subject: Feasibility Study Data Gap Investigation, Former Arkema Manufacturing Site, Tacoma, WA;  
Water Sample Data Validation Review Summary  
Client Project No.: Not Specified  
QA/QC Solutions, LLC Project No.: 092317.1

Dear Troy:

This letter documents the results of the data validation review of the conventional parameter, metals (elements), and volatile organic compound (VOC) analyses completed on water samples associated with Feasibility Study Data Gap Investigation completed at the Former Arkema Manufacturing Site located in Tacoma, Washington. Details of the investigation completed are provided in the Feasibility Study Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. (Pioneer 2017).

The data reported were validated to verify the laboratory quality assurance and quality control (QA/QC) procedures were documented and that the overall quality of the data reported is sufficient to support its intended purposes. A summary of the overall assessment of data quality, the data set, a summary of the analytical methods used to complete the chemical analyses, a summary of the data validation procedures used, and a summary of the reasons why data were qualified (including other items noted during data validation) is presented below.

### Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratory during the analysis of the samples were generally acceptable. Selected sample results required qualification during data validation because method-specific QA/QC criteria were not met; results maybe qualified for more than one reason. During data validation, the following actions were taken:

- A total of 287 results reported as detected were qualified as estimated (assigned a *J* qualifier).
- A total of 11 results reported as detected were restated as undetected (assigned a *U* qualifier).
- A total of 147 results reported as undetected (*U*) were qualified as undetected and estimated (assigned a *UJ* qualifier).
- A total of 23 results were rejected (*R*).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J or UJ*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data). Analytical data that were reported as undetected (*U*) by the laboratory or that were restated as undetected (*U*) during data validation are usable. Results that were rejected during data validation should not be used for any purpose.

***\*Data users must note that results may be qualified for more than one reason. A summary of the qualified data and reasons for qualification are in Table 2.***

## Data Set

The data set consisted of 360 water samples that were collected and submitted to the laboratory and was comprised of the following types of samples:

- 160 unfiltered natural samples.
- 160 filtered (0.45 µm) natural samples.
- 6 unfiltered natural field duplicate samples.
- 6 filtered (0.45 µm) natural field duplicate samples.
- 14 trip blanks.
- 6 unfiltered equipment blank samples.
- 6 filtered (0.45 µm) equipment blank samples.

Samples were collected during the month of October and November 2017. A summary of the samples collected and the analyses completed is presented in Table 1.

***\* Several samples required multiple reanalyses and only data considered reportable during data validation were reported in the electronic data deliverables (EDDs).***

Analyses were completed by Analytical Resources, Inc. (ARI) located in Tukwila, Washington. ARI submitted 18 work orders (see Table 1 for reference) summarizing the results of the samples and associated quality control data.

## Analytical Methods

The analytical methods that were used to complete the chemical analyses included the following:

- Selected volatile organic compounds (VOCs) (i.e., chloroform, tetrachloroethene, trichloroethene, and vinyl chloride) by purge and trap and analysis by gas chromatography/mass spectrometry (GC/MS) operated in the full scan mode using U.S. EPA SW-846 Methods 5030B and 8260C, respectively (U.S. EPA 2018).
- Total dissolved solids by filtration, drying until constant weight at 180 °C, and gravimetric determination using EPA 160.1 (U.S. EPA 1983).

- Dissolved anions (e.g., bromide, fluoride, nitrite, nitrate, Orthophosphorus, sulfate, and/or chloride) by ion chromatography using EPA Method 300.0 (U.S. EPA 1993). In a few instances, sulfate was analyzed by EPA Method 375.2 (U.S. EPA 1993) using colorimetric detection to minimize matrix interferences.
- Dissolved alkalinity (as bicarbonate, carbonate, hydroxide, and total) by titration using method SM 2320 B-97 (SM 2012).
- Dissolved Organic Carbon by high temperature combustion catalytic oxidation and on-dispersive infrared detection using method SM 5310 B-00 (SM 2012).
- Total metals (i.e., arsenic, copper, lead, and nickel) by inductively coupled plasma-mass spectrometry (ICP-MS) using SW-846 Method 6020A (U.S. EPA 2018).
- Total mercury by cold vapor atomic absorption (CVAA) using SW-846 Method 7470A (U.S. EPA 2018).
- Dissolved metals (i.e., aluminum, calcium, iron, magnesium, manganese, potassium, silicon, and sodium) by filtration through 0.45 µm filter, digestion, and analysis by inductively coupled plasma-optical emission spectroscopy (ICP-OES) using U.S. EPA SW-846 Method 6020A (U.S. EPA 2018).
- Dissolved metals (i.e., arsenic, copper, lead, and nickel) by filtration through 0.45 µm filter, digestion, and analysis by inductively coupled plasma-mass spectrometry (ICP-MS) using U.S. EPA SW-846 Method 6020A (U.S. EPA 2018).
- Total mercury by filtration through 0.45 µm filter and ample preparation and analysis by cold vapor atomic absorption (CVAA) using SW-846 Method 7470A (U.S. EPA 2018).

## Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results that were reported by the laboratory; this level of validation is also referred to as an abbreviated data review (equivalent to “Stage 2B” review per U.S. EPA 2009, which is equivalent to “Level EPA2B” for use with the Washington Department of Ecology EIMS database). The analytical data were validated generally following the applicable guidance and requirements:

- *Guidance on Environmental Data Verification and Validation* (U.S. EPA 2002)
- *USEPA Contract Laboratory Program, National Functional Guidelines for Superfund Organic Methods Data Review*. Final. OSWER 9240.1-45. USEPA/540/R-08/01 (U.S. EPA 2008).
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review*. Final. OSWER 9240.1-51. EPA 540-R-10-011 (U.S. EPA 2010).
- Method-specific and laboratory-established quality control requirements, as applicable.

Data validation procedures were modified to accommodate QA/QC requirements for methods (e.g., conventional parameters) that are not specifically addressed by the USEPA functional guidelines. In this

situation, method-specific and laboratory-established control limits were used, as necessary, to determine if qualification of the data was necessary. The laboratory data deliverables that were validated, if present, included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Results for applicable method blanks and field blanks to determine whether an analyte that was reported as detected in any sample was the result of possible contamination introduced at the laboratory or during field sampling, respectively.
- Results for applicable standard reference material (SRM), laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, matrix spike (MS), and/or matrix spike duplicate (MSD) recoveries to assess analytical accuracy
- Results for applicable laboratory duplicate sample, duplicate LCS, and/or MSD analyses to assess analytical precision.
- Results for the field duplicate samples to provide additional information in support of the quality assurance review.
- Laboratory summaries of analytical results.

Verification of applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed during the abbreviated data validation review. There may be analytical problems that could only be identified by completing a thorough review (i.e., 100-percent data validation) of all original instrument printouts and associated analytical quality control results. Verification of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narratives did not indicate any significant problems with data that were not reviewed during data validation. The adequacy of the sampling procedures was not completed during data validation.

Performance based control limits established by the laboratory and control limits provided in the method protocols were used to evaluate data quality and determine the need for data qualification. Applicable laboratory control limits (e.g., recoveries for surrogate compounds, LCSs and LCS duplicates, and MS/MSDs) were used during data validation. Data qualifiers were assigned during data validation to both hardcopy data sheets and the EDD when applicable QA/QC limits were not met and qualification of the data was warranted. Data qualifiers were assigned following guidance specified by U.S. EPA (2002, 2009, 2008, and 2010) and the quality control requirements specified in the applicable analytical methods.

## Reasons for Data Qualification

The reasons for data qualification and a summary of the qualified data are summarized in Table 2, which included the following:

- A total of 250 results reported as detected at a concentration above the method detection limit (MDL), but less than the reporting limit (RL) were qualified as estimated (*J*).
- A total of 100 VOC results were qualified as estimated (*J or UJ*) because air bubbles were noted in all of the sample containers associated with a given

sample. The results reported for all target VOCs in the affected samples were qualified.

- A total of 85 anion results were qualified as estimated (*J or UJ*) because method-specific holding time constraints were not met.
- A total of 34 anion results were qualified as estimated (*J or UJ*) because the recovery in a MS was outside the applicable control limit.
- A total of 9 anion results were qualified as estimated (*J or UJ*) because the recovery in a LCS was outside the applicable control limit.
- One anion and one metal result were qualified as estimated (*J*) because the concentrations were greater than the upper calibration range established during analysis. The laboratory should have completed dilutions.
- One lead result was qualified as estimated (*J*) because RPD for the associate laboratory replicate analysis was above the applicable control limit
- A total of 11 VOC results were restated as undetected (*U*) because the target compound was also detected in an associated blank. In this instance, the concentration found in the sample was <5 times the concentration found in the associate blank.
- A total of 23 anion results were reported as undetected were rejected (*R*) because the recoveries in the associated matrix spikes were at 0 percent.

*\*Data users should note that results may be qualified for more than one reason (see Table 2).*

### **General Comments**

The following general comments are provided to document some, but not all, items that were identified during data validation, but did not result in qualification of any data. The following comments are for informational purposes only.

- In some instances sample coolers were received at the laboratory at a temperature above the recommended 6 °C (U.S. EPA 2017). In this situation, the samples were collected and delivered to the laboratory on the same day and the coolers did not have sufficient time equilibrate.
- In several instances, selected samples required dilutions prior to analysis (as is required by the analytical methods) to obtain concentrations that were within the linear range of the instrument and/or to minimize the effects of matrix interferences to obtain reportable results. In some instances, non-detected results were reported at elevated reporting limits.
- For the analysis of anions, data users should note the results reported may exhibit a greater degree of uncertainty (e.g., biased low or biased high) for one, or more, reasons. Samples that exhibited high concentrations of one, or more of the target anions; high mineral content; elevated hardness (or that were basic with pH of 9 to 11); elevated elemental compositions; presence of non-target ions; and, other unidentified factors likely contributed to difficulties in accurate identification and/or quantification. This is not a reflection of laboratory performance, but rather the nature of the matrix itself. Such conditions could

result in direct chromatographic coelutions of anions; concentration dependent coelutions; ionic character displacement (e.g., shifting of retention times); peak tailing resulting in under or over estimation of an anion concentration; generation of poorly shaped chromatographic peaks (e.g., non-gaussian shape) resulting in under or over estimation of an anion concentration; column overload; and, any number of other conditions.

- The laboratory encountered difficulties that were matrix-related for the analysis of some samples. Data users should refer to the case narrative for additional details. As was stated above, verification of applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed. There may be analytical problems that could only be identified by completing a thorough review (i.e., 100-percent data validation). Verification of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time.

This concludes the data validation review summary. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at [jjmcateer@msn.com](mailto:jjmcateer@msn.com).

Cordially,



*QA/QC Solutions, LLC*

James J. Mc Ateer, Jr., Managing Member

Attachments

## **References**

Pioneer 2017. FS Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. February 2017. Prepared for Port of Tacoma. Prepared by Pioneer Technologies Corporation.

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U.S. EPA 2018. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. <https://www.epa.gov/hw-sw846/sw-846-compendium> (last updated on November 29, 2017). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC

**Table 1. Summary of Samples Collected and Analyses Completed**

| Sample Number                          | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|--|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| <b>Work Order 17J0102 (Revision 2)</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-119+25-ST1-100417                   | 17J0102-01               | 10/04/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-119+25-ST1-100417-(20)              | 17J0102-02               | 10/04/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| PW-120+75-ST1-100517                   | 17J0102-03               | 10/05/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-120+75-ST1-100517-(20)              | 17J0102-04               | 10/05/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| PW-123+25-ST1-100517                   | 17J0102-05               | 10/05/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-123+25-ST1-100517-(20)              | 17J0102-06               | 10/05/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| PW-125+00-ST1-100517                   | 17J0102-07               | 10/05/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-125+00-ST1-100517-(20)              | 17J0102-08               | 10/05/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| PW-126+80-ST1-100617                   | 17J0102-09               | 10/06/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-126+80-ST1-100617-(20)              | 17J0102-10               | 10/06/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| PW-128+50-ST1-100617                   | 17J0102-11               | 10/06/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-128+50-ST1-100617-(20)              | 17J0102-12               | 10/06/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| PW-130+75-ST1-100617                   | 17J0102-13               | 10/06/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-130+75-ST1-100617-(20)              | 17J0102-14               | 10/06/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| TB-TB-01-100617                        | 17J0102-15               | 10/04/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0197</b>              |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-3C6-1R-101117-4.5-9.5               | 17J0197-01               | 10/11/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3C6-1R-101117-4.5-9.5-(20)          | 17J0197-02               | 10/11/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3C7-2R-101117-24.3-29.3             | 17J0197-03               | 10/11/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3C7-2R-101117-24.3-29.3-(20)        | 17J0197-04               | 10/11/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-2C2-2-101117-20.6-25.6              | 17J0197-05               | 10/11/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-2C2-2-101117-20.6-25.6-(20)         | 17J0197-06               | 10/11/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-2C1-1R-101117-5.1-10.1-(20)         | 17J0197-07               | 10/11/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-2C1-1R-101117-5.1-10.1              | 17J0197-08               | 10/11/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-1C2-2-101117-13.8-23.6              | 17J0197-09               | 10/11/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-1C2-2-101117-13.8-23.6-(20)         | 17J0197-10               | 10/11/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-1C3-1-101117-3.5-8.5                | 17J0197-11               | 10/11/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-1C3-1-101117-3.5-8.5-(20)           | 17J0197-12               | 10/11/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-2D1-1-101217-7.5-12.5               | 17J0197-13               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-2D1-1-101217-7.5-12.5-(20)          | 17J0197-14               | 10/12/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-2D3-2-101217-26.5-31.5              | 17J0197-15               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |



Table 1, continued

| Sample Number                  | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|--------------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-2D3-2-101217-26.5-31.5-(20) | 17J0197-16               | 10/12/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-1D1-1-101217-9.6-14.6       | 17J0197-17               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-1D1-1-101217-9.6-14.6-(20)  | 17J0197-18               | 10/12/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3C5-2-101217-17.5-22.5      | 17J0197-19               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3C5-2-101217-17.5-22.5-(20) | 17J0197-20               | 10/12/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3C2-1-101217-7.5-12         | 17J0197-21               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3C2-1-101217-7.5-12-(20)    | 17J0197-22               | 10/12/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3C1-1-101217-3-8            | 17J0197-23               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3C1-1-101217-3-8-(20)       | 17J0197-24               | 10/12/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3D1-1-101217-4.5-12.5       | 17J0197-25               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3D1-1-101217-4.5-12.5-(20)  | 17J0197-26               | 10/12/17    |               | ✓                             |                               | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4D2-1-101217-4.3-9.3        | 17J0197-27               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4D2-1-101217-4.3-9.3-(20)   | 17J0197-28               | 10/12/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3E1-1-101217-5-10           | 17J0197-29               | 10/12/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3E1-1-101217-5-10-(20)      | 17J0197-30               | 10/12/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| Trip Blanks                    | 17J0197-31               | 10/11/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0239</b>      |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-2B1-1-101317-3-10           | 17J0239-01               | 10/13/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-2B1-1-101317-3-10-(20)      | 17J0239-02               | 10/13/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-2B2-2-101317-30.8-35.8      | 17J0239-03               | 10/13/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-2B2-2-101317-30.8-35.8-(20) | 17J0239-04               | 10/13/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-2A1-1-101317-9-14           | 17J0239-05               | 10/13/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-2A1-1-101317-9-14-(20)      | 17J0239-06               | 10/13/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4B3-1-101317-4.5-10.5       | 17J0239-07               | 10/13/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4B3-1-101317-4.5-10.5-(20)  | 17J0239-08               | 10/13/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4B2-2-101317-22.5-27.5-(20) | 17J0239-09               | 10/13/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4B2-2-101317-22.5-27.5      | 17J0239-10               | 10/13/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4B3-2-101317-17.5-27.5      | 17J0239-11               | 10/13/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4B3-2-101317-17.5-27.5-(20) | 17J0239-12               | 10/13/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3E1-2-101317-17.5-22.5      | 17J0239-13               | 10/13/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3E1-2-101317-17.5-22.5-(20) | 17J0239-14               | 10/13/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4F1-1-101317-4.5-9.5        | 17J0239-15               | 10/13/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |

Table 1, continued

| Sample Number                        | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|--------------------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-4F1-1-101317-4.5-9.5-(20)         | 17J0239-16               | 10/13/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| Trip Blank                           | 17J0239-17               | 10/13/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0283 (Revision)</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-3A3-1R-101617-8.2-13.2-(20)       | 17J0283-01               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-3A2-2R-101617-22.3-27.3-(20)      | 17J0283-02               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-3A7-1R-101617-(20)                | 17J0283-03               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-3A6-2R-101617-(20)                | 17J0283-04               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-4B4-1-101617-(20)                 | 17J0283-05               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-4B4-2-101617-(20)                 | 17J0283-06               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-4B4-2-101617-(21)                 | 17J0283-07               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-5B1-1R-101617-(20)                | 17J0283-08               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-5B1-2R-101617-(20)                | 17J0283-09               | 10/16/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| Lab login error; no sample           | 17J0283-10               | 10/16/17    |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-5C16-1R-101717-(20)               | 17J0283-11               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5C16-1R-101717-(21)               | 17J0283-12               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5C16-2R-101717-(20)               | 17J0283-13               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5C12-1-101717-(20)                | 17J0283-14               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5C10-2-101717-(20)                | 17J0283-15               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4C1-1-101717-(20)                 | 17J0283-16               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5C14-2-101717-(20)                | 17J0283-17               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3A3-1R-101617-8.2-13.2            | 17J0283-18               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-3A2-2R-101617-22.3-27.3           | 17J0283-19               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-3A7-1R-101617                     | 17J0283-20               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-3A6-2R-101617                     | 17J0283-21               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-4B4-1-101617                      | 17J0283-22               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-4B4-2-101617                      | 17J0283-23               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-4B4-2-101617-(01)                 | 17J0283-24               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-5B1-1R-101617                     | 17J0283-25               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-5B1-2R-101617                     | 17J0283-26               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-5C16-1R-101717                    | 17J0283-27               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5C16-1R-101717-(01)               | 17J0283-28               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5C16-2R-101717                    | 17J0283-29               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |

Table 1, continued

| Sample Number             | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|---------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-5C12-1-101717          | 17J0283-30               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5C10-2-101717          | 17J0283-31               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4C1-1-101717           | 17J0283-32               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5C14-2-101717          | 17J0283-33               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| TB                        | 17J0283-34               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0334</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-5D7-1R-101917-(20)     | 17J0334-01               | 10/19/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5D5-1-101917-(20)      | 17J0334-02               | 10/19/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5E4-1-101917-(20)      | 17J0334-03               | 10/19/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5D7-1R-101917          | 17J0334-04               | 10/19/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5D5-1-101917           | 17J0334-05               | 10/19/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5E4-1-101917           | 17J0334-06               | 10/19/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| TB                        | 17J0334-07               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0344</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-5C13-1-101717          | 17J0344-01               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5C13-1-101717-(20)     | 17J0344-02               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5D8-2-101717-(20)      | 17J0344-03               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5D8-2-101717           | 17J0344-04               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5E2-1-101817           | 17J0344-05               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5E2-1-101817-(20)      | 17J0344-06               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4D1-1-101817           | 17J0344-07               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4D1-1-101817-(20)      | 17J0344-08               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4E1-2-101817           | 17J0344-09               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4E1-2-101817-(20)      | 17J0344-10               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5E1-1-101817           | 17J0344-11               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5E1-1-101817-(20)      | 17J0344-12               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5F1-1-101817           | 17J0344-13               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5F1-1-101817-(20)      | 17J0344-14               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5E8-1-101817           | 17J0344-15               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5E8-1-101817-(20)      | 17J0344-16               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| EB-101717                 | 17J0344-17               | 10/17/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| EB-101717-(20)            | 17J0344-18               | 10/17/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |

Table 1, continued

| Sample Number             | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|---------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-5E1-2-101817           | 17J0344-19               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5E1-2-101817-(20)      | 17J0344-20               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| EB-101817                 | 17J0344-21               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| EB-101817-(20)            | 17J0344-22               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4F1-2-101817           | 17J0344-23               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4F1-2-101817-(20)      | 17J0344-24               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4F1-2-101817-(01)      | 17J0344-25               | 10/18/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4F1-2-101817-(21)      | 17J0344-26               | 10/18/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| TB                        | 17J0344-27               | 10/16/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0394</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-6E5-1-102017-(20)      | 17J0394-01               | 10/20/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6F1-2-102017-(20)      | 17J0394-02               | 10/20/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6F2-1-102017-(20)      | 17J0394-03               | 10/20/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5G1-1-102017-(20)      | 17J0394-04               | 10/20/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6G1-1-102017-(20)      | 17J0394-05               | 10/20/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5C21-2-102017-(20)     | 17J0394-06               | 10/20/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4C2-1-102017-(20)      | 17J0394-07               | 10/20/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6E5-1-102017           | 17J0394-08               | 10/20/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6F1-2-102017           | 17J0394-09               | 10/20/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6F2-1-102017           | 17J0394-10               | 10/20/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5G1-1-102017           | 17J0394-11               | 10/20/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6G1-1-102017           | 17J0394-12               | 10/20/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5C21-2-102017          | 17J0394-13               | 10/20/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4C2-1-102017           | 17J0394-14               | 10/20/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| <b>Work Order 17J0430</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-7F2-1-102317           | 17J0430-01               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7F2-1-102317-(20)      | 17J0430-02               | 10/23/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7F3-1-102317           | 17J0430-03               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7F3-1-102317-(20)      | 17J0430-04               | 10/23/17    |               | ✓                             | ✓                             |  |  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7F1-2-102317           | 17J0430-05               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7F1-2-102317-(20)      | 17J0430-06               | 10/23/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7F4-1-102317           | 17J0430-07               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |

Table 1, continued

| Sample Number             | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|---------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-7F4-1-102317-(20)      | 17J0430-08               | 10/23/17    |               | ✓                             | ✓                             |  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E9-2-102317           | 17J0430-09               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E9-2-102317-(20)      | 17J0430-10               | 10/23/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E10-1-102317          | 17J0430-11               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E10-1-102317-(20)     | 17J0430-12               | 10/23/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E4-2-102317           | 17J0430-13               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E4-2-102317-(20)      | 17J0430-14               |             |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6E12-2-102317          | 17J0430-15               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6E12-2-102317-(20)     | 17J0430-16               | 10/23/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| EB-102317                 | 17J0430-17               | 10/23/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| EB-102317-(20)            | 17J0430-18               | 10/23/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| Trip Blanks               | 17J0430-19               | 10/23/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0453</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-7E6-2-102417           | 17J0453-01               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E6-2-102417-(20)      | 17J0453-02               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E8-1-102417           | 17J0453-03               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E8-1-102417-(20)      | 17J0453-04               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E16-2-102417          | 17J0453-05               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E16-2-102417-(20)     | 17J0453-06               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6E2-1-102417           | 17J0453-07               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6E2-1-102417-(20)      | 17J0453-08               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6E6-1-102417           | 17J0453-09               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6E6-1-102417-(20)      | 17J0453-10               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E3-1-102417           | 17J0453-11               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E3-1-102417-(20)      | 17J0453-12               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6B19-2-102417          | 17J0453-13               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6B19-2-102417-(20)     | 17J0453-14               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6B19-2-102417-(01)     | 17J0453-15               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6B19-2-102417-(21)     | 17J0453-16               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6D25-2-102417          | 17J0453-17               | 10/24/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6D25-2-102417-(20)     | 17J0453-18               | 10/24/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| TB                        | 17J0453-19               | 10/24/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |

Table 1, continued

| Sample Number                | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|------------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| <b>Work Order 17J0479</b>    |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-6G3-2-102517              | 17J0479-01               | 10/25/17    | ✓             |                               |                               | ✓  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6G3-2-102517-(20)         | 17J0479-02               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6H1-1-102517              | 17J0479-03               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6H1-1-102517-(20)         | 17J0479-04               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E13-2R-102517            | 17J0479-05               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E13-2R-102517-(20)       | 17J0479-06               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6D14-1-102517             | 17J0479-07               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6D14-1-102517-(20)        | 17J0479-08               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6E1-1-102517              | 17J0479-09               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6E1-1-102517-(20)         | 17J0479-10               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6E9-2-102517              | 17J0479-11               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6E9-2-102517-(20)         | 17J0479-12               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5D2-1R-102517             | 17J0479-13               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5D2-1R-102517-(20)        | 17J0479-14               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6D25-1-102517             | 17J0479-15               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6D25-1-102517-(20)        | 17J0479-16               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E7-2-102517              | 17J0479-17               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E7-2-102517-(20)         | 17J0479-18               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-8F1-1R-102517             | 17J0479-19               | 10/25/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-8F1-1R-102517-(20)        | 17J0479-20               | 10/25/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| Trip Blanks                  | 17J0479-21               | 10/23/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0505</b>    |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-1B4-1-102617-2.9-7.9      | 17J0505-01               | 10/26/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-1B4-1-102617-2.9-7.9-(20) | 17J0505-02               | 10/26/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| TB                           | 17J0505-03               | 10/23/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0529</b>    |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-7I1-1-102717              | 17J0529-01               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7I1-1-102717-(20)         | 17J0529-02               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7I1-1-102717-(01)         | 17J0529-03               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7I1-1-102717-(21)         | 17J0529-04               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7I3-2-102717              | 17J0529-05               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7I3-2-102717-(20)         | 17J0529-06               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |

Table 1, continued

| Sample Number             | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|---------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-8H1-1-102717           | 17J0529-07               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-8H1-1-102717-(20)      | 17J0529-08               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7G1-2-102717           | 17J0529-09               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7G1-2-102717-(20)      | 17J0529-10               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7G1-1-102717           | 17J0529-11               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7G1-1-102717-(20)      | 17J0529-12               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-8G2-1-102717           | 17J0529-13               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-8G2-1-102717-(20)      | 17J0529-14               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-8G3-2-102717           | 17J0529-15               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-8G3-2-102717-(20)      | 17J0529-16               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-8F2-2R-102717          | 17J0529-17               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-8F2-2R-102717-(20)     | 17J0529-18               | 10/27/17    |               | ✓                             | ✓                             |  |  | ✓  |                        | ✓   | ✓                                  | ✓                          |
| GW-131+00-1-102717        | 17J0529-19               | 10/27/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-131+00-1-102717-(20)   | 17J0529-20               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| <b>Work Order 17J0562</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-131+00-2-102717        | 17J0562-01               | 10/27/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-131+00-2-102717-(20)   | 17J0562-02               | 10/27/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-129+65-0-103017        | 17J0562-03               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-129+65-0-103017-(20)   | 17J0562-04               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-128+30-0-103017        | 17J0562-05               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-128+30-0-103017-(20)   | 17J0562-06               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-128+30-2-103017        | 17J0562-07               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-128+30-2-103017-(20)   | 17J0562-08               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-129+65-2-103017        | 17J0562-09               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-129+65-2-103017-(20)   | 17J0562-10               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-126+90-2-103017        | 17J0562-11               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-126+90-2-103017-(20)   | 17J0562-12               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-125+50-2-103017        | 17J0562-13               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-125+50-2-103017-(20)   | 17J0562-14               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-124+00-2-103017        | 17J0562-15               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-124+00-2-103017-(20)   | 17J0562-16               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-6E3-2-103017           | 17J0562-17               | 10/30/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |

Table 1, continued

| Sample Number                          | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|--|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-6E3-2-103017-(20)                   | 17J0562-18               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-121+80-2-103017                     | 17J0562-19               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-121+80-2-103017-(20)                | 17J0562-20               | 10/30/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| Trip Blank                             | 17J0562-21               | 10/27/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17J0578 Revision)</b>    |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-125+50-1-103117                     | 17J0578-01               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-125+50-1-103117-(20)                | 17J0578-02               | 10/31/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-126+90-0-103117                     | 17J0578-03               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-126+90-0-103117-(20)                | 17J0578-04               | 10/31/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-125+50-0-103117                     | 17J0578-05               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-125+50-0-103117-(20)                | 17J0578-06               | 10/31/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-124+00-1-103117                     | 17J0578-07               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-124+00-1-103117-(20)                | 17J0578-08               | 10/31/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-124+00-0-103117                     | 17J0578-09               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-124+00-0-103117-(20)                | 17J0578-10               | 10/31/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-126+90-3-103117                     | 17J0578-11               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-126+90-3-103117-(20)                | 17J0578-12               | 10/31/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-126+90-3-103117-(01)                | 17J0578-13               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-126+90-3-103117-(21)                | 17J0578-14               | 10/31/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-120+75-2-103117                     | 17J0578-15               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-120+75-2-103117-(20)                | 17J0578-16               | 10/31/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| Trip Blank                             | 17J0578-17               | 10/30/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-129+65-1-103017-(20)                | 17J0578-18               | 10/30/17    |               |                               |                               |  |  | ✓  |                        |   |                                    |                            |
| GW-128+30-1-103017-(20)                | 17J0578-19               | 10/31/17    |               |                               |                               |  |  | ✓  |                        |   |                                    |                            |
| <b>Work Order 17K0014 (Revision 2)</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-129+65-1-103117                     | 17K0014-01               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-129+65-1-103117-(20)                | 17K0014-02               | 10/31/17    |               | ✓                             | ✓                             | ✓  |  |  |                        |   |                                    |                            |
| GW-128+30-1-103117                     | 17K0014-03               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-128+30-1-103117-(20)                | 17K0014-04               | 10/31/17    |               | ✓                             | ✓                             | ✓  |  |  |                        |   |                                    |                            |
| GW-5G1-3-110117                        | 17K0014-05               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5G1-3-110117-(20)                   | 17K0014-06               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6G2-3-110117                        | 17K0014-07               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |



Table 1, continued

| Sample Number                        | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|--------------------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-6G2-3-110117- (20)                | 17K0014-08               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5H1-1-110117                      | 17K0014-09               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5H1-1-110117-(20)                 | 17K0014-10               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4G1-3-110117                      | 17K0014-11               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4G1-3-110117-(20)                 | 17K0014-12               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5H2-2-110117                      | 17K0014-13               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5H2-2-110117-(20)                 | 17K0014-14               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4G2-2-110117                      | 17K0014-15               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4G2-2-110117-(20)                 | 17K0014-16               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-4H3-1-110117                      | 17K0014-17               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4H3-1-110117- (20)                | 17K0014-18               | 11/01/17    |               | ✓                             | ✓                             |  |  | ✓  |                        | ✓   | ✓                                  | ✓                          |
| GW-5I2-1-110117                      | 17K0014-19               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5I2-1-110117- (20)                | 17K0014-20               | 11/01/17    |               | ✓                             | ✓                             |  |  | ✓  |                        | ✓   | ✓                                  | ✓                          |
| GW-4H4-2-110117                      | 17K0014-21               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-4H4-2-110117-(20)                 | 17K0014-22               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-5D1-3-110117                      | 17K0014-23               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-5D1-3-110117- (20)                | 17K0014-24               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6E7-3-110117                      | 17K0014-25               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6E7-3-110117- (20)                | 17K0014-26               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| EB-110117                            | 17K0014-27               | 11/01/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| EB-110117- (20)                      | 17K0014-28               | 11/01/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| TB                                   | 17K0014-29               | 10/31/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17K0038 (Revision)</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-122+60-2-110217                   | 17K0038-01               | 11/02/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-122+60-2-110217-(20)              | 17K0038-02               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-126+90-1-110217                   | 17K0038-03               | 11/02/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-126+90-1-110217-(20)              | 17K0038-04               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-5B1-3R-110217                     | 17K0038-05               | 11/02/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-5B1-3R-110217-(20)                | 17K0038-06               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-4B2-3-110217                      | 17K0038-07               | 11/02/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-4B2-3-110217-(20)                 | 17K0038-08               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-4B1-3-110217                      | 17K0038-09               | 11/02/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |

Table 1, continued

| Sample Number                        | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|--------------------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| GW-4B1-3-110217-(20)                 | 17K0038-10               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-3A1-3R-110217                     | 17K0038-11               | 11/02/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-3A1-3R-110217-(20)                | 17K0038-12               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| EB-110217                            | 17K0038-13               | 11/02/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| EB-110217-(20)                       | 17K0038-14               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-7E5-3-110217                      | 17K0038-15               | 11/02/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-7E5-3-110217-(20)                 | 17K0038-16               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| GW-6E8-3-110217                      | 17K0038-17               | 11/02/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-6E8-3-110217-(20)                 | 17K0038-18               | 11/02/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| <b>Work Order 17K0066 (Revision)</b> |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-121+80-1-110317                   | 17K0066-01               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-121+80-1-110317-(20)              | 17K0066-02               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-122+60-1-110317                   | 17K0066-03               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-122+60-1-110317-(20)              | 17K0066-04               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-122+60-3-110317                   | 17K0066-05               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-122+60-3-110317-(20)              | 17K0066-06               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-122+60-0-110317                   | 17K0066-07               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-122+60-0-110317-(20)              | 17K0066-08               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-124+00-3-110317                   | 17K0066-09               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-124+00-3-110317-(20)              | 17K0066-10               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-125+50-3-110317                   | 17K0066-11               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-125+50-3-110317-(20)              | 17K0066-12               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-128+30-3-110317                   | 17K0066-13               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-128+30-3-110317-(20)              | 17K0066-14               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-129+65-3-110317                   | 17K0066-15               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-129+65-3-110317-(20)              | 17K0066-16               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-131+00-3-110317                   | 17K0066-17               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| GW-131+00-3-110317-(20)              | 17K0066-18               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        |   |                                    |                            |
| GW-1C1-3-110317                      | 17K0066-19               | 11/03/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| GW-1C1-3-110317-(20)                 | 17K0066-20               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |
| EB-110317                            | 17K0066-21               | 11/03/17    | ✓             |                               |                               |  |  | ✓  | ✓                      |   |                                    |                            |
| EB-110317-(20)                       | 17K0066-22               | 11/03/17    |               | ✓                             | ✓                             | ✓  | ✓  |  |                        | ✓   | ✓                                  | ✓                          |

Table 1, continued

| Sample Number                   | Laboratory Sample Number | Sample Date | VOCs by 8260C | Dissolved Solids by EPA 160.1 | Dissolved Anions by EPA 300.0 | Alkalinity (as bicarbonate, carbonate, hydroxide, and total) by SM 2320 B-97 (dissolved) | Dissolved Organic Carbon by SM 5310 B-00 | Total Metals (As, Cu, Lead, and Ni) by 6020A | Total Mercury by 7040A | Dissolved Al, Ca, Fe, Mg, Mn, K, Si, Na) by 6010C | Dissolved As, Cu, Pb, and Ni 6020A | Dissolved Mercury by 7040A |
|---------------------------------|--------------------------|-------------|---------------|-------------------------------|-------------------------------|--|--|--|------------------------|---|------------------------------------|----------------------------|
| TB                              | 17K0066-23               | 11/03/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| <b>Work Order 17K0256</b>       |                          |             |               |                               |                               |  |  |  |                        |   |                                    |                            |
| EB-111517                       | 17K0256-01               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| EB-111517-(20)                  | 17K0256-02               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-120+75-ST1-DS-111517         | 17K0256-03               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-120+75-ST1-DS-111517-(20)    | 17K0256-04               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-120+75-SW-111517             | 17K0256-05               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-120+75-SW-111517-(20)        | 17K0256-06               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-122+60-0-DS-111517           | 17K0256-07               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-122+60-0-DS-111517-(20)      | 17K0256-08               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-124+00-0-DS-111517           | 17K0256-09               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-124+00-0-DS-111517-(20)      | 17K0256-10               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-125+00-ST1-DS-111517         | 17K0256-11               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-125+00-ST1-DS-111517-(20)    | 17K0256-12               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-125+00-SW-111517             | 17K0256-13               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-125+00-SW-111517-(20)        | 17K0256-14               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-125+50-0-DS-111517           | 17K0256-15               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-125+50-0-DS-111517-(20)      | 17K0256-16               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-126+90-0-DS-111517           | 17K0256-17               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-126+90-0-DS-111517-(20)      | 17K0256-18               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-128+30-0-DS-111517           | 17K0256-19               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-128+30-0-DS-111517-(20)      | 17K0256-20               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-128+50-ST1-DS-111517         | 17K0256-21               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-128+50-ST1-DS-111517-(20)    | 17K0256-22               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| PW-128+50-SW-111517             | 17K0256-23               | 11/15/17    | ✓             |                               |                               |  |  |  |                        |   |                                    |                            |
| PW-128+50-SW-111517-(20)        | 17K0256-24               | 11/15/17    |               | ✓                             | ✓                             | ✓  |  | ✓  |                        |   |                                    |                            |
| <b>Total Number of Samples:</b> |                          |             | 186           | 172                           | 171                           | 168  | 171                                      | 112  | 112                    | 110   | 110                                | 110                        |

**Table 2. Summary of Qualified Data**

| Sample Number*                     | Laboratory Sample Number | Chemical            | Concentration | Units | MDL   | RL    | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason                         | Quality Control Result                                     | Possible Bias <sup>b,c,d</sup> |
|------------------------------------|--------------------------|---------------------|---------------|-------|-------|-------|----------------------|---------------------------|--|--|--------------------------------|
| <b>Conventional Parameter Data</b> |                          |                     |               |       |       |       |                      |                           |  |  |                                |
| PW-119+25-ST1-100417-(20)          | 17J0102-02               | Nitrate             | ND            | mg/L  | 10.0  | 10.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0102-02               | Orthophosphate      | ND            | mg/L  | 10.0  | 10.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0102-02RE1            | Nitrite             | ND            | mg/L  | 50.0  | 50.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
| PW-120+75-ST1-100517-(20)          | 17J0102-04               | Nitrate             | ND            | mg/L  | 10.0  | 10.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0102-04               | Orthophosphate      | ND            | mg/L  | 10.0  | 10.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0102-04RE1            | Nitrite             | ND            | mg/L  | 50.0  | 50.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
| PW-123+25-ST1-100517-(20)          | 17J0102-06RE1            | Nitrite             | ND            | mg/L  | 50.0  | 50.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
| PW-125+00-ST1-100517-(20)          | 17J0102-08RE1            | Nitrite             | ND            | mg/L  | 50.0  | 50.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
| GW-3C6-1R-101117-4.5-9.5-(20)      | 17J0197-02               | Nitrite             | ND            | mg/L  | 10.0  | 10.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-02RE1            | Orthophosphate      | 20.4          | mg/L  | 2.00  | 2.00  | H, D                 | J                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0197-02RE1            | Nitrate             | 2.00          | mg/L  | 2.00  | 2.00  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0197-02RE1            | Bromine anion (Br-) | ND            | mg/L  | 2.00  | 2.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-3C7-2R-101117-24.3-29.3-(20)    | 17J0197-04RE1            | Nitrite             | ND            | mg/L  | 50.0  | 50.0  | H, U                 | R                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0197-04               | Bromine anion (Br-) | 20.6          | mg/L  | 10.0  | 10.0  | D                    | J                         | MS recovery <10%                               | Recovery of 0% (not rejected because reported as a detect) | Low                            |
| GW-2C2-2-101117-20.6-25.6-(20)     | 17J0197-06               | Bromine anion (Br-) | ND            | mg/L  | 10.0  | 10.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-06RE1            | Nitrite             | ND            | mg/L  | 50.0  | 50.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-2C1-1R-101117-5.1-10.1-(20)     | 17J0197-07RE1            | Bromine anion (Br-) | ND            | mg/L  | 1.00  | 1.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    |                          | Nitrite             | ND            | mg/L  | 1.00  | 1.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-1C2-2-101117-13.8-23.6-(20)     | 17J0197-10               | Nitrite             | ND            | mg/L  | 10.0  | 10.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-10RE1            | Bromine anion (Br-) | 5.22          | mg/L  | 5.00  | 5.00  | D                    | J                         | MS recovery <10%                               | Recovery of 0% (not rejected because reported as a detect) | Low                            |
| GW-1C3-1-101117-3.5-8.5-(20)       | 17J0197-12RE1            | Bromine anion (Br-) | ND            | mg/L  | 1.00  | 1.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    |                          | Nitrite             | ND            | mg/L  | 1.00  | 1.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-2D1-1-101217-7.5-12.5-(20)      | 17J0197-14RE1            | Bromine anion (Br-) | ND            | mg/L  | 2.00  | 2.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-14RE1            | Nitrite             | ND            | mg/L  | 2.00  | 2.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-2D3-2-101217-26.5-31.5-(20)     | 17J0197-16               | Bromine anion (Br-) | ND            | mg/L  | 10.0  | 10.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-16RE1            | Nitrite             | ND            | mg/L  | 50.0  | 50.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-1D1-1-101217-9.6-14.6-(20)      | 17J0197-18RE1            | Orthophosphate      | 7.17          | mg/L  | 1.00  | 1.00  | H, D                 | J                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0197-18RE1            | Nitrite             | ND            | mg/L  | 1.00  | 1.00  | H, U                 | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-18RE1            | Nitrate             | ND            | mg/L  | 1.00  | 1.00  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0197-18RE1            | Bromine anion (Br-) | ND            | mg/L  | 1.00  | 1.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-3C5-2-101217-17.5-22.5-(20)     | 17J0197-20RE1            | Nitrite             | ND            | mg/L  | 50.0  | 50.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-20               | Bromine anion (Br-) | 26.0          | mg/L  | 10.0  | 10.0  | D                    | J                         | MS recovery <10%                               | Recovery of 0% (not rejected because reported as a detect) | Low                            |
| GW-3C2-1-101217-7.5-12-(20)        | 17J0197-22               | Nitrite             | ND            | mg/L  | 10.0  | 10.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-22RE1            | Orthophosphate      | 6.03          | mg/L  | 2.00  | 2.00  | H, D                 | J                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0197-22RE1            | Nitrate             | 2.00          | mg/L  | 2.00  | 2.00  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0197-22RE1            | Bromine anion (Br-) | ND            | mg/L  | 2.00  | 2.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-3C1-1-101217-3-8-(20)           | 17J0197-24               | Nitrite             | ND            | mg/L  | 10.0  | 10.0  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-24RE1            | Bromine anion (Br-) | ND            | mg/L  | 2.00  | 2.00  | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
| GW-3D1-1-101217-4.5-12.5-(20)      | 17J0197-26RE1            | Nitrite             | ND            | mg/L  | 0.200 | 0.200 | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    |                          | Bromine anion (Br-) | 0.606         | mg/L  | 0.200 | 0.200 | D                    | J                         | MS recovery <10%                               | Recovery of 0% (not rejected because reported as a detect) | Low                            |
| GW-3E1-1-101217-5-10-(20)          | 17J0197-30RE1            | Nitrite             | ND            | mg/L  | 0.100 | 0.100 | U                    | R                         | MS recovery <10%                               | Recovery of 0%   | Unknown                        |
|                                    | 17J0197-30RE1            | Bromine anion (Br-) | 0.760         | mg/L  | 0.100 | 0.100 | U                    | J                         | MS recovery <10%                               | Recovery of 0% (not rejected because reported as a detect) | Low                            |
| GW-2B2-2-101317-30.8-35.8-(20)     | 17J0239-04RE3            | Nitrate             | ND            | mg/L  | 10.0  | 10.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0239-04RE3            | Nitrite             | ND            | mg/L  | 10.0  | 10.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |
|                                    | 17J0239-04RE3            | Orthophosphate      | ND            | mg/L  | 10.0  | 10.0  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs.                                  | Low or high                    |

Table 2, continued

| Sample Number*                 | Laboratory Sample Number | Chemical       | Concentration | Units | MDL   | RL    | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason                             | Quality Control Result                      | Possible Bias <sup>b,c,d</sup> |
|--------------------------------|--------------------------|----------------|---------------|-------|-------|-------|----------------------|---------------------------|--|---|--------------------------------|
|                                |                          |                |               |       |       |       |                      |                           |  |   |                                |
| GW-2A1-1-101317-9-14-(20)      | 17J0239-06               | Chloride       | 238           | mg/L  | 10.0  | 10.0  | E, D                 | J                         | Upper calibration range exceeded in 1:100 dilution | Concentration above upper calibration range | Low or high                    |
|                                | 17J0239-06RE2            | Orthophosphate | 0.21          | mg/L  | 0.10  | 0.10  | H                    | J                         | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-06RE2            | Nitrate        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-06RE2            | Nitrite        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-4B2-2-101317-22.5-27.5-(20) | 17J0239-09RE1            | Nitrate        | ND            | mg/L  | 2.00  | 2.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-09RE1            | Nitrite        | ND            | mg/L  | 2.00  | 2.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-09RE1            | Orthophosphate | ND            | mg/L  | 2.00  | 2.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-4B3-2-101317-17.5-27.5-(20) | 17J0239-12RE1            | Nitrate        | ND            | mg/L  | 2.00  | 2.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-12RE1            | Nitrite        | ND            | mg/L  | 2.00  | 2.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-12RE1            | Orthophosphate | ND            | mg/L  | 2.00  | 2.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-3E1-2-101317-17.5-22.5-(20) | 17J0239-14RE1            | Nitrate        | ND            | mg/L  | 1.00  | 1.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-14RE1            | Nitrite        | ND            | mg/L  | 1.00  | 1.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-14RE1            | Orthophosphate | ND            | mg/L  | 1.00  | 1.00  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-4F1-1-101317-4.5-9.5-(20)   | 17J0239-16RE1            | Nitrate        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0239-16RE1            | Nitrite        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-3A3-1R-101617-8.2-13.2-(20) | 17J0283-01RE1            | Nitrate        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0283-01RE1            | Nitrite        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-3A6-2R-101617-(20)          | 17J0283-04RE1            | Nitrate        | ND            | mg/L  | 2.00  | 2.00  | U, H                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0283-04RE1            | Nitrite        | ND            | mg/L  | 2.00  | 2.00  | U, H                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0283-04RE1            | Orthophosphate | ND            | mg/L  | 2.00  | 2.00  | U, H                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-4C1-1-101717-(20)           | 17J0283-16RE2            | Nitrite        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0283-16RE2            | Nitrate        | ND            | mg/L  | 0.100 | 0.100 | U, H                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-5C13-1-101717-(20)          | 17J0344-02               | Nitrate        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0344-02               | Nitrite        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0344-02RE1            | Orthophosphate | 8.88          | mg/L  | 0.50  | 0.50  | H, D                 | J                         | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-5D8-2-101717-(20)           | 17J0344-03               | Nitrate        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0344-03               | Nitrite        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0344-03               | Orthophosphate | ND            | mg/L  | 0.10  | 0.10  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-5E2-1-101817-(20)           | 17J0344-06RE1            | Orthophosphate | 2.97          | mg/L  | 0.20  | 0.20  | H, D                 | J                         | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-4D1-1-101817-(20)           | 17J0344-08RE1            | Orthophosphate | 6.85          | mg/L  | 0.50  | 0.50  | H, D                 | J                         | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-5F1-1-101817-(20)           | 17J0344-14RE2            | Orthophosphate | 5.54          | mg/L  | 0.50  | 0.50  | H, D                 | J                         | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| EB-101717-(20)                 | 17J0344-18               | Nitrate        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                |                          | Orthophosphate | ND            | mg/L  | 0.10  | 0.10  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-6G3-2-102517-(20)           | 17J0479-02               | Nitrite        | ND            | mg/L  | 0.100 | 0.100 | U                    | UJ                        | MS recovery below lower control limit              | MS recovery = 57.5%                         | Low                            |
|                                | 17J0479-02RE1            | Orthophosphate | 0.57          | mg/L  | 0.50  | 0.50  | D                    | J                         | MS recovery below lower control limit              | MS recovery = 47.1%                         | Low                            |
|                                | 17J0479-02RE3            | Fluoride       | 0.560         | mg/L  | 0.500 | 0.500 | D                    | J                         | MS recovery below lower control limit              | MS recovery = 47.4%                         | Low                            |
| GW-131+00-2-102717-(20)        | 17J0562-02               | Nitrate        | 0.100         | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0562-02               | Nitrite        | 0.100         | mg/L  | 0.100 | 0.100 | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0562-02RE1            | Orthophosphate | 2.30          | mg/L  | 0.50  | 0.50  | H, D                 | J                         | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-124+00-2-103017-(20)        | 17J0562-16               | Nitrite        | 0.100         | mg/L  | 0.100 | 0.100 | U                    | UJ                        | MS recovery below lower control limit              | MS recovery = 33.7%                         | Low                            |
| GW-125+50-1-103117-(20)        | 17J0578-02RE1            | Orthophosphate | ND            | mg/L  | 0.50  | 0.50  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
|                                | 17J0578-02RE1            | Nitrate        | ND            | mg/L  | 0.100 | 0.100 | U                    | UJ                        | MS recovery below lower control limit              | MS recovery = 66.6%                         | Low                            |
|                                | 17J0578-02RE1            | Nitrite        | 0.176         | mg/L  | 0.100 | 0.100 | U                    | J                         | MS recovery below lower control limit              | MS recovery = 33.7%                         | Low                            |
| GW-126+90-0-103117-(20)        | 17J0578-04RE1            | Orthophosphate | ND            | mg/L  | 0.50  | 0.50  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-125+50-0-103117-(20)        | 17J0578-06RE1            | Orthophosphate | ND            | mg/L  | 0.50  | 0.50  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-124+00-1-103117-(20)        | 17J0578-08RE1            | Orthophosphate | ND            | mg/L  | 0.50  | 0.50  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |
| GW-124+00-0-103117-(20)        | 17J0578-10RE1            | Orthophosphate | ND            | mg/L  | 0.50  | 0.50  | H, U                 | UJ                        | Method-specific holding time criterion not met     | Samples analyzed >48 hrs.                   | Low or high                    |

Table 2, continued

| Sample Number*                 | Laboratory Sample Number | Chemical       | Concentration | Units | MDL    | RL     | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason                         | Quality Control Result    | Possible Bias <sup>b,c,d</sup> |
|--------------------------------|--------------------------|----------------|---------------|-------|--------|--------|----------------------|---------------------------|--|---------------------------|--------------------------------|
| GW-126+90-3-103117-(20)        | 17J0578-12RE1            | Orthophosphate | ND            | mg/L  | 0.50   | 0.50   | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-126+90-3-103117-(21)        | 17J0578-14RE1            | Orthophosphate | ND            | mg/L  | 0.50   | 0.50   | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-129+65-1-103117-(20)        | 17K0014-02               | Nitrate        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Orthophosphate | ND            | mg/L  | 0.50   | 0.50   | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-128+30-1-103117-(20)        | 17K0014-04               | Nitrate        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Orthophosphate | ND            | mg/L  | 0.50   | 0.50   | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-5G1-3-110117-(20)           | 17K0014-06               | Orthophosphate | 1.65          | mg/L  | 0.50   | 0.50   | H, D                 | J                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrate        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-6G2-3-110117-(20)           | 17K0014-08               | Nitrate        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Orthophosphate | ND            | mg/L  | 0.50   | 0.50   | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-5H1-1-110117-(20)           | 17K0014-10               | Orthophosphate | 0.77          | mg/L  | 0.50   | 0.50   | H, D                 | J                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrate        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-4G1-1-110117-(20)           | 17K0014-12               | Orthophosphate | 1.19          | mg/L  | 0.50   | 0.50   | H, D                 | J                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrate        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-5H2-2-110117-(20)           | 17K0014-14               | Orthophosphate | 1.24          | mg/L  | 0.50   | 0.50   | H, D                 | J                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrate        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-4G2-2-110117-(20)           | 17K0014-16               | Orthophosphate | 1.16          | mg/L  | 0.50   | 0.50   | H, D                 | J                         | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrate        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
|                                |                          | Nitrite        | ND            | mg/L  | 0.500  | 0.500  | H, U                 | UJ                        | Method-specific holding time criterion not met | Samples analyzed >48 hrs. | Low or high                    |
| GW-122+60-2-110217-(20)        | 17K0038-02               | Orthophosphate | 8.40          | mg/L  | 0.50   | 0.50   | D                    | J                         | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| GW-126+90-1-110217-(20)        | 17K0038-04               | Orthophosphate | ND            | mg/L  | 0.50   | 0.50   | U                    | UJ                        | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| GW-5B1-3R-110217-(20)          | 17K0038-06               | Orthophosphate | ND            | mg/L  | 0.50   | 0.50   | U                    | UJ                        | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| GW-4B2-3-110217-(20)           | 17K0038-08               | Orthophosphate | 2.81          | mg/L  | 0.50   | 0.50   | D                    | J                         | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| GW-4B1-3-110217-(20)           | 17K0038-10               | Orthophosphate | ND            | mg/L  | 0.10   | 0.10   | U                    | UJ                        | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| GW-3A1-3R-110217-(20)          | 17K0038-12               | Orthophosphate | 0.55          | mg/L  | 0.50   | 0.50   | D                    | J                         | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| EB-110217-(20)                 | 17K0038-14               | Orthophosphate | ND            | mg/L  | 0.10   | 0.10   | U                    | UJ                        | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| GW-7E5-3-110217-(20)           | 17K0038-16               | Orthophosphate | 0.74          | mg/L  | 0.50   | 0.50   | D                    | J                         | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| GW-6E8-3-110217-(20)           | 17K0038-18               | Orthophosphate | 0.68          | mg/L  | 0.50   | 0.50   | D                    | J                         | Recovery in LCS below lower control limit      | Recovery of 81.2%         | Low                            |
| <b>Metals Data</b>             |                          |                |               |       |        |        |                      |                           |  |                           |                                |
| GW-1C2-2-101117-13.8-23.6-(20) | 17J0197-10               | Aluminum       | 0.0290        | mg/L  | 0.017  | 0.05   | J, D                 | J                         | Concentration is >MDL, <RL                     | NA                        | Low or high                    |
| GW-1C3-1-101117-3.5-8.5-(20)   | 17J0197-12               | Aluminum       | 0.0297        | mg/L  | 0.0085 | 0.025  | J                    | J                         | Concentration is >MDL, <RL                     | NA                        | Low or high                    |
| GW-1D1-1-101217-9.6-14.6-(20)  | 17J0197-18               | Aluminum       | 0.0487        | mg/L  | 0.0085 | 0.025  | J                    | J                         | Concentration is >MDL, <RL                     | NA                        | Low or high                    |
| GW-3C2-1-101217-7.5-12-(20)    | 17J0197-22               | Aluminum       | 0.0289        | mg/L  | 0.0085 | 0.025  | J                    | J                         | Concentration is >MDL, <RL                     | NA                        | Low or high                    |
| GW-3E1-1-101217-5-10-(20)      | 17J0197-30               | Aluminum       | 0.0401        | mg/L  | 0.0085 | 0.025  | J                    | J                         | Concentration is >MDL, <RL                     | NA                        | Low or high                    |
| GW-5C12-1-101717-(20)          | 17J0283-14               | Aluminum       | 0.140         | mg/L  | 0.0850 | 0.250  | J, D                 | J                         | Concentration is >MDL, <RL                     | NA                        | Low or high                    |
|                                |                          | Iron           | 0.169         | mg/L  | 0.0130 | 0.025  | J, D                 | J                         | Concentration is >MDL, <RL                     | NA                        | Low or high                    |
|                                |                          | Manganese      | 0.0093        | mg/L  | 0.0034 | 0.0050 | J, D                 | J                         | Concentration is >MDL, <RL                     | NA                        | Low or high                    |

Table 2, continued

| Sample Number*        | Laboratory Sample Number | Chemical                             | Concentration                       | Units                        | MDL                                  | RL                                | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result | Possible Bias <sup>b,c,d</sup>                           |
|-----------------------|--------------------------|--------------------------------------|-------------------------------------|------------------------------|--------------------------------------|-----------------------------------|----------------------|---------------------------|--|------------------------|--|
| GW-4C1-1-101717-(20)  | 17J0283-16               | Aluminum                             | 0.158                               | mg/L                         | 0.0425                               | 0.125                             | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-5E4-1-101917-(20)  | 17J0334-03               | Aluminum                             | 0.236                               | mg/L                         | 0.0425                               | 0.125                             | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-4D1-1-101817-(20)  | 17J0344-08               | Aluminum<br>Magnesium                | 0.106<br>0.141                      | mg/L<br>mg/L                 | 0.0425<br>0.0800                     | 0.125<br>0.125                    | J, D<br>J, D         | J<br>J                    | Concentration is >MDL, <RL<br>Concentration is >MDL, <RL   | NA<br>NA               | Low or high<br>Low or high                               |
| GW-5F1-1-101817-(20)  | 17J0344-14               | Aluminum                             | 0.0680                              | mg/L                         | 0.0170                               | 0.0500                            | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-5E8-1-101817-(20)  | 17J0344-16               | Aluminum                             | 0.0111                              | mg/L                         | 0.0085                               | 0.025                             | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| EB-101717-(20)        | 17J0344-18               | Calcium<br>Iron                      | 0.0082<br>0.0050                    | mg/L<br>mg/L                 | 0.0051<br>0.0013                     | 0.025<br>0.025                    | J<br>J               | J<br>J                    | Concentration is >MDL, <RL<br>Concentration is >MDL, <RL   | NA<br>NA               | Low or high<br>Low or high                               |
| GW-5E1-2-101817-(20)  | 17J0344-20               | Calcium<br>Iron<br>Silicon<br>Sodium | 0.0066<br>0.0017<br>0.0191<br>0.222 | mg/L<br>mg/L<br>mg/L<br>mg/L | 0.0051<br>0.0013<br>0.0052<br>0.0114 | 0.025<br>0.025<br>0.0300<br>0.250 | J<br>J<br>J<br>J     | J<br>J<br>J<br>J          | Concentration is >MDL, <RL<br>Concentration is >MDL, <RL<br>Concentration is >MDL, <RL<br>Concentration is >MDL, <RL | NA<br>NA<br>NA<br>NA   | Low or high<br>Low or high<br>Low or high<br>Low or high |
| EB-101817-(20)        | 17J0344-22               | Aluminum                             | 0.0735                              | mg/L                         | 0.0170                               | 0.0500                            | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-4F1-2-101817-(20)  | 17J0344-24               | Aluminum                             | 0.0638                              | mg/L                         | 0.0170                               | 0.0500                            | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-4F1-2-101817-(21)  | 17J0344-26               | Aluminum                             | 0.0651                              | mg/L                         | 0.0170                               | 0.0500                            | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-6F2-1-102017-(20)  | 17J0394-03               | Aluminum                             | 0.0134                              | mg/L                         | 0.0085                               | 0.0250                            | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-6G1-1-102017-(20)  | 17J0394-05               | Aluminum                             | 0.0270                              | mg/L                         | 0.0085                               | 0.0250                            | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-5C21-2-102017-(20) | 17J0394-06               | Aluminum                             | 0.0657                              | mg/L                         | 0.0425                               | 0.125                             | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-4C2-1-102017-(20)  | 17J0394-07               | Aluminum                             | 0.0228                              | mg/L                         | 0.0085                               | 0.025                             | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-7F2-1-102317-(20)  | 17J0430-02               | Aluminum                             | 0.0268                              | mg/L                         | 0.0085                               | 0.025                             | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-7F3-1-102317-(20)  | 17J0430-04               | Calcium<br>Iron                      | 2.25<br>6.00                        | mg/L<br>mg/L                 | 1.02<br>0.260                        | 5.00<br>5.00                      | J, D<br>J, D         | J<br>J                    | Concentration is >MDL, <RL<br>Concentration is >MDL, <RL   | NA<br>NA               | Low or high<br>Low or high                               |
| GW-7F1-2-102317-(20)  | 17J0430-06               | Iron                                 | 0.0497                              | mg/L                         | 0.0065                               | 0.125                             | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-7E9-2-102317-(20)  | 17J0430-10               | Iron                                 | 0.0392                              | mg/L                         | 0.0013                               | 0.025                             | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-7E4-2-102317-(20)  | 17J0430-14               | Aluminum                             | 0.0453                              | mg/L                         | 0.017                                | 0.05                              | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| EB-102317-(20)        | 17J0430-18               | Calcium<br>Iron<br>Sodium            | 0.0068<br>0.0119<br>0.315           | mg/L<br>mg/L<br>mg/L         | 0.0051<br>0.0013<br>0.0114           | 0.025<br>0.025<br>0.250           | J<br>J<br>J          | J<br>J<br>J               | Concentration is >MDL, <RL<br>Concentration is >MDL, <RL<br>Concentration is >MDL, <RL                               | NA<br>NA<br>NA         | Low or high<br>Low or high<br>Low or high                |
| GW-6E6-1-102417-(20)  | 17J0453-10               | Magnesium                            | 0.183                               | mg/L                         | 0.16                                 | 0.25                              | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-6G3-2-102517-(20)  | 17J0479-02               | Aluminum                             | 0.0526                              | mg/L                         | 0.0425                               | 0.125                             | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-6E1-1-102517-(20)  | 17J0479-10               | Aluminum                             | 0.0286                              | mg/L                         | 0.017                                | 0.05                              | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-6E9-2-102517-(20)  | 17J0479-12               | Aluminum                             | 0.0807                              | mg/L                         | 0.017                                | 0.05                              | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-5D2-1R-102517-(20) | 17J0479-14               | Aluminum<br>Iron<br>Manganese        | 0.156<br>0.263<br>0.0052            | mg/L<br>mg/L<br>mg/L         | 0.085<br>0.013<br>0.0034             | 0.25<br>0.25<br>0.005             | J, D<br>J, D<br>J, D | J<br>J<br>J               | Concentration is >MDL, <RL<br>Concentration is >MDL, <RL<br>Concentration is >MDL, <RL                               | NA<br>NA<br>NA         | Low or high<br>Low or high<br>Low or high                |
| GW-6D25-1-102517-(20) | 17J0479-16               | Aluminum                             | 0.0182                              | mg/L                         | 0.0085                               | 0.025                             | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-7E7-2-102517-(20)  | 17J0479-18               | Aluminum                             | 0.0434                              | mg/L                         | 0.017                                | 0.05                              | J, D                 | J                         | Concentration is >MDL, <RL   | NA                     | Low or high  |
| GW-8F1-1R-102517-(20) | 17J0479-20               | Aluminum<br>Magnesium<br>Manganese   | 0.190<br>0.280<br>0.0067            | mg/L<br>mg/L<br>mg/L         | 0.085<br>0.16<br>0.0034              | 0.25<br>0.25<br>0.005             | J, D<br>J, D<br>J, D | J<br>J<br>J               | Concentration is >MDL, <RL<br>Concentration is >MDL, <RL<br>Concentration is >MDL, <RL                               | NA<br>NA<br>NA         | Low or high<br>Low or high<br>Low or high                |

Table 2, continued

| Sample Number*                  | Laboratory Sample Number | Chemical             | Concentration | Units | MDL    | RL     | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason                | Quality Control Result   | Possible Bias <sup>b,c,d</sup> |
|---------------------------------|--------------------------|----------------------|---------------|-------|--------|--------|----------------------|---------------------------|---------------------------------------|--|--------------------------------|
| GW-1B4-1-102617-2.9-7.9-(20)    | 17J0505-02               | Sodium               | 50.9          | mg/L  | 0.0114 | 0.25   | E                    | J                         | Upper calibration range exceeded      | Concentration above upper calibration range; no dilution was completed | Low or high                    |
|                                 |                          | Aluminum             | 0.0170        | mg/L  | 0.0085 | 0.025  | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-711-1-102717-(21)            | 17J0529-04               | Aluminum             | 0.0168        | mg/L  | 0.0085 | 0.025  | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-7G1-1-102717-(20)            | 17J0529-12               | Aluminum             | 0.0144        | mg/L  | 0.0085 | 0.025  | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-8G2-1-102717-(20)            | 17J0529-14               | Iron                 | 0.162         | mg/L  | 0.0065 | 0.125  | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Manganese            | 0.0024        | mg/L  | 0.0017 | 0.0025 | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-8G3-2-102717-(20)            | 17J0529-16               | Iron                 | 0.0733        | mg/L  | 0.0065 | 0.125  | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Manganese            | 0.0019        | mg/L  | 0.0017 | 0.0025 | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-5H2-2-110117-(20)            | 17K0014-14               | Aluminum             | 0.0228        | mg/L  | 0.017  | 0.05   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-4G2-2-110117-(20)            | 17K0014-16               | Aluminum             | 0.0678        | mg/L  | 0.017  | 0.05   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-4H3-1-110117-(20)            | 17K0014-18               | Calcium              | 7.89          | mg/L  | 1.02   | 5      | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 | 17K0014-18               | Iron                 | 2.53          | mg/L  | 0.26   | 5      | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 | 17K0014-18RE1            | Manganese            | 0.132         | mg/L  | 0.068  | 0.1    | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-5I2-1-110117-(20)            | 17K0014-20               | Aluminum             | 4.48          | mg/L  | 0.85   | 2.5    | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 | 17K0014-20               | Iron                 | 2.47          | mg/L  | 0.130  | 2.5    | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 | 17K0014-20RE1            | Manganese            | 0.0548        | mg/L  | 0.034  | 0.05   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-4H4-2-110117-(20)            | 17K0014-22               | Aluminum             | 0.0196        | mg/L  | 0.017  | 0.05   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Iron                 | 0.0942        | mg/L  | 0.0026 | 0.05   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-5D1-3-110117-(20)            | 17K0014-24               | Aluminum             | 0.0583        | mg/L  | 0.0425 | 0.125  | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| EB-110117-(20)                  | 17K0014-28               | Iron                 | 0.0021        | mg/L  | 0.0013 | 0.025  | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Sodium               | 0.0829        | mg/L  | 0.0114 | 0.25   | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| EB-110217-(20)                  | 17K0038-14               | Iron                 | 0.0070        | mg/L  | 0.0013 | 0.025  | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Potassium            | 0.169         | mg/L  | 0.052  | 0.25   | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| EB-110317-(20)                  | 17K0066-22               | Iron                 | 0.0104        | mg/L  | 0.0013 | 0.025  | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Potassium            | 0.0948        | mg/L  | 0.052  | 0.25   | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Sodium               | 0.109         | mg/L  | 0.0114 | 0.25   | J                    | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-2C2-2-101117-20.6-25.6       | 17J0197-05               | Lead and Compounds   | 1.76          | ug/L  | 1.36   | 1.36   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-3D1-1-101217-4.5-12.5        | 17J0197-25               | Lead and Compounds   | 0.325         | ug/L  | 0.068  | 0.068  |                      | J                         | Lab replicate RPD above control limit | RPD was 28.9   | Low or high                    |
| GW-3C6-1R-101117-4.5-9.5-(20)   | 17J0197-02               | Nickel Soluble Salts | 6.66          | ug/L  | 1      | 5      | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-3C7-2R-101117-24.3-29.3      | 17J0197-03               | Arsenic, Inorganic   | 3.38          | ug/L  | 0.440  | 2      | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-3C7-2R-101117-24.3-29.3-(20) | 17J0197-04               | Arsenic, Inorganic   | 3.84          | ug/L  | 0.440  | 2.00   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-2C2-2-101117-20.6-25.6       | 17J0197-05               | Nickel Soluble Salts | 3.68          | ug/L  | 1.00   | 5.00   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-2C2-2-101117-20.6-25.6-(20)  | 17J0197-06               | Nickel Soluble Salts | 1.36          | ug/L  | 1.00   | 5.00   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-1C2-2-101117-13.8-23.6       | 17J0197-09               | Nickel Soluble Salts | 2.22          | ug/L  | 1.00   | 5.00   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-1C2-2-101117-13.8-23.6-(20)  | 17J0197-10               | Nickel Soluble Salts | 2.10          | ug/L  | 1.00   | 5.00   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-1C3-1-101117-3.5-8.5         | 17J0197-11               | Nickel Soluble Salts | 1.53          | ug/L  | 0.250  | 1.25   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-1C3-1-101117-3.5-8.5-(20)    | 17J0197-12               | Nickel Soluble Salts | 1.38          | ug/L  | 0.250  | 1.25   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-2D1-1-101217-7.5-12.5        | 17J0197-13               | Copper               | 1.79          | ug/L  | 1.70   | 2.50   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Nickel Soluble Salts | 0.975         | ug/L  | 0.250  | 1.25   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
| GW-2D1-1-101217-7.5-12.5-(20)   | 17J0197-14               | Copper               | 1.86          | ug/L  | 1.70   | 2.50   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |
|                                 |                          | Nickel Soluble Salts | 1.20          | ug/L  | 0.250  | 1.25   | J, D                 | J                         | Concentration is >MDL, <RL            | NA   | Low or high                    |



Table 2, continued

| Sample Number*                 | Laboratory Sample Number | Chemical             | Concentration | Units | MDL   | RL    | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason     | Quality Control Result | Possible Bias <sup>b,c,d</sup> |
|--------------------------------|--------------------------|----------------------|---------------|-------|-------|-------|----------------------|---------------------------|----------------------------|------------------------|--------------------------------|
| GW-2D3-2-101217-26.5-31.5      | 17J0197-15               | Arsenic, Inorganic   | 2.32          | ug/L  | 0.440 | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                |                          | Nickel Soluble Salts | 1.24          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-2D3-2-101217-26.5-31.5-(20) | 17J0197-16               | Arsenic, Inorganic   | 2.46          | ug/L  | 0.440 | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-3C5-2-101217-17.5-22.5-(20) | 17J0197-20               | Arsenic, Inorganic   | 7.30          | ug/L  | 1.10  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-2B1-1-101317-3-10           | 17J0239-01               | Copper               | 9.78          | ug/L  | 6.80  | 10.0  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                |                          | Nickel Soluble Salts | 8.22          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-2B2-2-101317-30.8-35.8      | 17J0239-03               | Nickel Soluble Salts | 1.02          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-2B2-2-101317-30.8-35.8-(20) | 17J0239-04               | Arsenic, Inorganic   | 14.8          | ug/L  | 4.40  | 20.0  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-4B2-2-101317-22.5-27.5      | 17J0239-10               | Nickel Soluble Salts | 2.34          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-4B3-2-101317-17.5-27.5      | 17J0239-11               | Arsenic, Inorganic   | 1.92          | ug/L  | 0.440 | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-4B3-2-101317-17.5-27.5-(20) | 17J0239-12               | Arsenic, Inorganic   | 3.82          | ug/L  | 0.440 | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-3E1-2-101317-17.5-22.5-(20) | 17J0239-14               | Arsenic, Inorganic   | 2.42          | ug/L  | 0.440 | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C16-1R-101717-(20)         | 17J0283-11               | Nickel Soluble Salts | 0.842         | ug/L  | 0.100 | 0.500 | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C16-1R-101717-(21)         | 17J0283-12               | Nickel Soluble Salts | 0.900         | ug/L  | 0.100 | 0.500 | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C14-2-101717-(20)          | 17J0283-17               | Nickel Soluble Salts | 2.84          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C16-1R-101717              | 17J0283-27               | Nickel Soluble Salts | 0.355         | ug/L  | 0.250 | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C16-1R-101717-(01)         | 17J0283-28               | Nickel Soluble Salts | 0.660         | ug/L  | 0.250 | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C16-2R-101717              | 17J0283-29               | Nickel Soluble Salts | 0.735         | ug/L  | 0.250 | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C14-2-101717               | 17J0283-33               | Nickel Soluble Salts | 5.94          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E4-1-101917-(20)           | 17J0334-03               | Nickel Soluble Salts | 3.84          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5D7-1R-101917               | 17J0334-04               | Nickel Soluble Salts | 1.23          | ug/L  | 0.250 | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E4-1-101917                | 17J0334-06               | Nickel Soluble Salts | 5.42          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C13-1-101717               | 17J0344-01               | Copper               | 2.14          | ug/L  | 1.70  | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C13-1-101717-(20)          | 17J0344-02               | Nickel Soluble Salts | 3.67          | ug/L  | 0.500 | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5D8-2-101717-(20)           | 17J0344-03               | Arsenic, Inorganic   | 2.92          | ug/L  | 0.440 | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5D8-2-101717                | 17J0344-04               | Arsenic, Inorganic   | 2.72          | ug/L  | 0.440 | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E2-1-101817                | 17J0344-05               | Nickel Soluble Salts | 4.34          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E2-1-101817-(20)           | 17J0344-06               | Nickel Soluble Salts | 1.56          | ug/L  | 0.250 | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-4E1-2-101817-(20)           | 17J0344-10               | Arsenic, Inorganic   | 3.00          | ug/L  | 0.440 | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E1-1-101817                | 17J0344-11               | Nickel Soluble Salts | 1.55          | ug/L  | 0.250 | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E1-1-101817-(20)           | 17J0344-12               | Nickel Soluble Salts | 0.898         | ug/L  | 0.100 | 0.500 | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5F1-1-101817                | 17J0344-13               | Nickel Soluble Salts | 1.30          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5F1-1-101817-(20)           | 17J0344-14               | Nickel Soluble Salts | 1.16          | ug/L  | 1.00  | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E8-1-101817                | 17J0344-15               | Nickel Soluble Salts | 0.820         | ug/L  | 0.250 | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E8-1-101817-(20)           | 17J0344-16               | Copper               | 0.706         | ug/L  | 0.680 | 1.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                |                          | Nickel Soluble Salts | 0.808         | ug/L  | 0.100 | 0.500 | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |

Table 2, continued

| Sample Number*        | Laboratory Sample Number | Chemical             | Concentration | Units | MDL    | RL    | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason     | Quality Control Result | Possible Bias <sup>b,c,d</sup> |
|-----------------------|--------------------------|----------------------|---------------|-------|--------|-------|----------------------|---------------------------|----------------------------|------------------------|--------------------------------|
| EB-101717             | 17J0344-17               | Arsenic, Inorganic   | 0.0630        | ug/L  | 0.0220 | 0.100 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                       |                          | Copper               | 0.496         | ug/L  | 0.340  | 0.500 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| EB-101717-(20)        | 17J0344-18               | Arsenic, Inorganic   | 0.0600        | ug/L  | 0.0440 | 0.200 | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5E1-2-101817       | 17J0344-19               | Arsenic, Inorganic   | 0.0490        | ug/L  | 0.0220 | 0.100 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-4F1-2-101817       | 17J0344-23               | Nickel Soluble Salts | 1.36          | ug/L  | 1.00   | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6E5-1-102017-(20)  | 17J0394-01               | Copper               | 0.380         | ug/L  | 0.340  | 0.500 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6F1-2-102017-(20)  | 17J0394-02               | Arsenic, Inorganic   | 1.92          | ug/L  | 0.220  | 1.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6F1-2-102017       | 17J0394-09               | Nickel Soluble Salts | 0.520         | ug/L  | 0.500  | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-5C21-2-102017      | 17J0394-13               | Nickel Soluble Salts | 4.50          | ug/L  | 0.500  | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7F1-2-102317       | 17J0430-05               | Nickel Soluble Salts | 2.73          | ug/L  | 0.500  | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7F1-2-102317-(20)  | 17J0430-06               | Nickel Soluble Salts | 2.82          | ug/L  | 1.00   | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7F4-1-102317-(20)  | 17J0430-08               | Copper               | 22.8          | ug/L  | 17.0   | 25.0  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7E9-2-102317       | 17J0430-09               | Nickel Soluble Salts | 1.08          | ug/L  | 0.250  | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7E9-2-102317-(20)  | 17J0430-10               | Nickel Soluble Salts | 0.730         | ug/L  | 0.250  | 1.25  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7E10-1-102317-(20) | 17J0430-12               | Copper               | 2.50          | ug/L  | 1.70   | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6E12-2-102317      | 17J0430-15               | Nickel Soluble Salts | 3.36          | ug/L  | 1.00   | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6E12-2-102317-(20) | 17J0430-16               | Nickel Soluble Salts | 3.14          | ug/L  | 1.00   | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| EB-102317             | 17J0430-17               | Arsenic, Inorganic   | 0.0300        | ug/L  | 0.0220 | 0.100 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| EB-102317-(20)        | 17J0430-18               | Arsenic, Inorganic   | 0.188         | ug/L  | 0.0220 | 0.100 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6E6-1-102417-(20)  | 17J0453-10               | Nickel Soluble Salts | 18.5          | ug/L  | 2.50   | 12.5  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7E3-1-102417       | 17J0453-11               | Copper               | 2.00          | ug/L  | 1.70   | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7E3-1-102417-(20)  | 17J0453-12RE1            | Nickel Soluble Salts | 4.26          | ug/L  | 0.500  | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6B19-2-102417      | 17J0453-13               | Copper               | 1.83          | ug/L  | 1.70   | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6B19-2-102417-(20) | 17J0453-14               | Copper               | 2.03          | ug/L  | 1.70   | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6B19-2-102417-(01) | 17J0453-15               | Copper               | 1.91          | ug/L  | 1.70   | 2.50  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6D25-2-102417-(20) | 17J0453-18               | Nickel Soluble Salts | 6.45          | ug/L  | 2.50   | 12.5  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6G3-2-102517       | 17J0479-01               | Arsenic, Inorganic   | 2.94          | ug/L  | 0.440  | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6E9-2-102517       | 17J0479-11               | Copper               | 4.84          | ug/L  | 3.40   | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6E9-2-102517-(20)  | 17J0479-12               | Nickel Soluble Salts | 9.78          | ug/L  | 1.00   | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-6D25-1-102517      | 17J0479-15               | Copper               | 0.395         | ug/L  | 0.340  | 0.500 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7G1-2-102717       | 17J0529-09               | Arsenic, Inorganic   | 2.70          | ug/L  | 0.440  | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-7G1-2-102717-(20)  | 17J0529-10               | Arsenic, Inorganic   | 1.40          | ug/L  | 0.440  | 2.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-8G2-1-102717       | 17J0529-13               | Nickel Soluble Salts | 0.0920        | ug/L  | 0.0500 | 0.250 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                       |                          | Copper               | 9.08          | ug/L  | 6.80   | 10.0  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
| GW-8G3-2-102717       | 17J0529-15               | Copper               | 0.354         | ug/L  | 0.340  | 0.500 | J                    | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                       |                          | Nickel Soluble Salts | 6.04          | ug/L  | 1.00   | 5.00  | J, D                 | J                         | Concentration is >MDL, <RL | NA                     | Low or high                    |

Table 2, continued

| Sample Number*             | Laboratory Sample Number | Chemical             | Concentration | Units | MDL      | RL       | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result  | Possible Bias <sup>b,c,d</sup> |
|----------------------------|--------------------------|----------------------|---------------|-------|----------|----------|----------------------|---------------------------|--|-------------------------|--------------------------------|
| GW-8G3-2-102717-(20)       | 17J0529-16               | Nickel Soluble Salts | 5.76          | ug/L  | 1.00     | 5.00     | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-8F2-2R-102717           | 17J0529-17               | Nickel Soluble Salts | 0.478         | ug/L  | 0.0500   | 0.250    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-5G1-3-110117-(20)       | 17K0014-06               | Arsenic, Inorganic   | 0.915         | ug/L  | 0.110    | 0.500    | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-6G2-3-110117            | 17K0014-07               | Nickel Soluble Salts | 0.200         | ug/L  | 0.0500   | 0.250    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-6G2-3-110117-(20)       | 17K0014-08               | Nickel Soluble Salts | 0.107         | ug/L  | 0.0500   | 0.250    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-5H2-2-110117            | 17K0014-13               | Nickel Soluble Salts | 0.330         | ug/L  | 0.250    | 1.25     | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-5H2-2-110117-(20)       | 17K0014-14               | Nickel Soluble Salts | 0.385         | ug/L  | 0.250    | 1.25     | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-4G2-2-110117-(20)       | 17K0014-16               | Nickel Soluble Salts | 0.812         | ug/L  | 0.100    | 0.500    | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-4H3-1-110117            | 17K0014-17               | Copper               | 10.3          | ug/L  | 8.50     | 12.5     | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-4H4-2-110117            | 17K0014-21               | Nickel Soluble Salts | 1.31          | ug/L  | 0.250    | 1.25     | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-4H4-2-110117-(20)       | 17K0014-22               | Nickel Soluble Salts | 0.835         | ug/L  | 0.250    | 1.25     | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-6E7-3-110117            | 17K0014-25               | Copper               | 0.928         | ug/L  | 0.680    | 1.00     | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
|                            |                          | Nickel Soluble Salts | 0.352         | ug/L  | 0.100    | 0.500    | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-6E7-3-110117-(20)       | 17K0014-26               | Nickel Soluble Salts | 0.282         | ug/L  | 0.100    | 0.500    | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| EB-110117                  | 17K0014-27               | Arsenic, Inorganic   | 0.0820        | ug/L  | 0.0220   | 0.100    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
|                            |                          | Nickel Soluble Salts | 0.109         | ug/L  | 0.0500   | 0.250    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-4B1-3-110217            | 17K0038-09               | Arsenic, Inorganic   | 0.745         | ug/L  | 0.110    | 0.500    | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-4B1-3-110217-(20)       | 17K0038-10               | Arsenic, Inorganic   | 0.830         | ug/L  | 0.110    | 0.500    | J, D                 | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| EB-110217                  | 17K0038-13               | Arsenic, Inorganic   | 0.0260        | ug/L  | 0.0220   | 0.100    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
|                            |                          | Nickel Soluble Salts | 0.0920        | ug/L  | 0.0500   | 0.250    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-7E5-3-110217            | 17K0038-15               | Arsenic, Inorganic   | 0.158         | ug/L  | 0.0220   | 0.100    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
|                            |                          | Copper               | 0.354         | ug/L  | 0.340    | 0.500    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
|                            |                          | Nickel Soluble Salts | 0.168         | ug/L  | 0.0500   | 0.250    | J                    | U                         | Detected in equipment blank  | Detected at 0.0920 ug/L | False positive                 |
| GW-7E5-3-110217-(20)       | 17K0038-16               | Arsenic, Inorganic   | 0.0940        | ug/L  | 0.0220   | 0.100    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-6E8-3-110217            | 17K0038-17               | Nickel Soluble Salts | 0.478         | ug/L  | 0.0500   | 0.250    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-6E8-3-110217-(20)       | 17K0038-18               | Arsenic, Inorganic   | 0.180         | ug/L  | 0.0220   | 0.100    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
|                            |                          | Nickel Soluble Salts | 0.0810        | ug/L  | 0.0500   | 0.250    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| EB-110317                  | 17K0066-21               | Arsenic, Inorganic   | 0.0840        | ug/L  | 0.0220   | 0.100    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
|                            |                          | Nickel Soluble Salts | 0.208         | ug/L  | 0.0500   | 0.250    | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-6G2-3-110117            | 17K0014-07               | Mercury (elemental)  | ND            | mg/L  | 0.000007 | 0.000050 | U                    | UJ                        | MS recovery above upper control limit  | MS recovery = 134%      | Likely none                    |
| <b>VOC Data</b>            |                          |                      |               |       |          |          |                      |                           |  |                         |                                |
| GW-3C7-2R-101117-24.3-29.3 | 17J0197-03               | Tetrachloroethylene  | ND            | ug/L  | 0.05     | 0.10     | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |
|                            |                          | Vinyl Chloride       | ND            | ug/L  | 0.06     | 0.10     | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |
|                            |                          | Chloroform           | ND            | ug/L  | 0.03     | 0.10     | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |
|                            |                          | Trichloroethylene    | ND            | ug/L  | 0.05     | 0.10     | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |
| GW-2C2-2-101117-20.6-25.6  | 17J0197-05               | Tetrachloroethylene  | ND            | ug/L  | 0.05     | 0.10     | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |
|                            |                          | Trichloroethylene    | ND            | ug/L  | 0.05     | 0.10     | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |
|                            |                          | Chloroform           | ND            | ug/L  | 0.03     | 0.10     | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |
|                            |                          | Vinyl Chloride       | ND            | ug/L  | 0.06     | 0.10     | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |
| GW-1D1-1-101217-9.6-14.6   | 17J0197-17               | Vinyl Chloride       | 0.10          | ug/L  | 0.06     | 0.10     | J                    | J                         | Concentration is >MDL, <RL   | NA                      | Low or high                    |
| GW-3C5-2-101217-17.5-22.5  | 17J0197-19               | Trichloroethylene    | 0.14          | ug/L  | 0.05     | 0.10     | J                    | J                         | Concentration is >MDL, <RL and laboratory noted air bubbles present in all sample containers | NA                      | Low or high                    |
|                            |                          | Tetrachloroethylene  | 0.60          | ug/L  | 0.05     | 0.10     |                      | J                         | Laboratory noted air bubbles present in all sample containers                                | NA                      | Low or high                    |

Table 2, continued

| Sample Number*             | Laboratory Sample Number  | Chemical            | Concentration | Units | MDL  | RL   | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason  | Quality Control Result | Possible Bias <sup>b,c,d</sup> |
|----------------------------|---|---------------------|---------------|-------|------|------|----------------------|---------------------------|---|------------------------|--------------------------------|
| GW-3C2-1-101217-7.5-12     | 17J0197-21RE1<br>17J0197-21RE1<br>17J0197-21RE1<br>17J0197-21RE1<br>17J0197-21RE2 | Chloroform          | 6.40          | ug/L  | 0.03 | 0.10 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Vinyl Chloride      | 0.90          | ug/L  | 0.06 | 0.10 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Chloroform          | 3630          | ug/L  | 5.46 | 20.0 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Trichloroethylene   | 588           | ug/L  | 9.78 | 20.0 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Vinyl Chloride      | 789           | ug/L  | 11.4 | 20.0 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
| GW-3D1-1-101217-4.5-12.5   | 17J0197-25  | Tetrachloroethylene | 0.16          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
|                            |   | Vinyl Chloride      | 0.15          | ug/L  | 0.06 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-2B1-1-101317-3-10       | 17J0239-01  | Chloroform          | 0.04          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
|                            |   | Tetrachloroethylene | 0.13          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-2A1-1-101317-9-14       | 17J0239-05  | Chloroform          | 0.03          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
|                            |   | Tetrachloroethylene | 0.13          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-4B3-2-101317-17.5-27.5  | 17J0239-11  | Trichloroethylene   | 0.06          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
|                            |   | Chloroform          | 0.06          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-3E1-2-101317-17.5-22.5  | 17J0239-13  | Chloroform          | 0.05          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-3A3-1R-101617-8.2-13.2  | 17J0283-18  | Tetrachloroethylene | 0.11          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-3A2-2R-101617-22.3-27.3 | 17J0283-19  | Vinyl Chloride      | 0.15          | ug/L  | 0.06 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-3A7-1R-101617           | 17J0283-20  | Vinyl Chloride      | 0.06          | ug/L  | 0.06 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-3A6-2R-101617           | 17J0283-21  | Vinyl Chloride      | 0.16          | ug/L  | 0.06 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-4B4-1-101617            | 17J0283-22  | Trichloroethylene   | 0.09          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-4B4-2-101617            | 17J0283-23  | Trichloroethylene   | 0.08          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
|                            |   | Vinyl Chloride      | 0.07          | ug/L  | 0.06 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-4B4-2-101617-(01)       | 17J0283-24  | Vinyl Chloride      | 0.08          | ug/L  | 0.06 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
|                            |   | Trichloroethylene   | 0.07          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-5B1-1R-101617           | 17J0283-25  | Trichloroethylene   | 0.08          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-5C16-1R-101717          | 17J0283-27  | Trichloroethylene   | 0.10          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-5C16-1R-101717-(01)     | 17J0283-28  | Trichloroethylene   | 0.09          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-5C12-1-101717           | 17J0283-30  | Tetrachloroethylene | 0.06          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-5C14-2-101717           | 17J0283-33  | Trichloroethylene   | 0.07          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-5D5-1-101917            | 17J0334-05  | Trichloroethylene   | 0.07          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-5E4-1-101917            | 17J0334-06  | Vinyl Chloride      | 0.08          | ug/L  | 0.06 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-5C13-1-101717           | 17J0344-01  | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Chloroform          | ND            | ug/L  | 0.03 | 0.20 | U                    | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Trichloroethylene   | 0.27          | ug/L  | 0.05 | 0.20 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Vinyl Chloride      | 1.87          | ug/L  | 0.06 | 0.20 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
| GW-5D8-2-101717            | 17J0344-04  | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Chloroform          | ND            | ug/L  | 0.03 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Trichloroethylene   | 0.21          | ug/L  | 0.05 | 0.20 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Vinyl Chloride      | 0.28          | ug/L  | 0.06 | 0.20 |                      | J                         | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
| GW-5E2-1-101817            | 17J0344-05  | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Chloroform          | ND            | ug/L  | 0.03 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                            |   | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
| GW-4D1-1-101817            | 17J0344-07  | Chloroform          | 0.26          | ug/L  | 0.03 | 0.10 | J                    | U                         | Detected in equipment blank                                   | Detected at 0.26 ug/L  | False positive                 |

Table 2, continued

| Sample Number*       | Laboratory Sample Number   | Chemical            | Concentration | Units | MDL  | RL   | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason  | Quality Control Result                        | Possible Bias <sup>b,c,d</sup> |
|----------------------|--|---------------------|---------------|-------|------|------|----------------------|---------------------------|---|---|--------------------------------|
|                      |  |                     |               |       |      |      |                      |                           |   |   |                                |
| GW-4E1-2-101817      | 17J0344-09   | Chloroform          | ND            | ug/L  | 0.03 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| GW-5F1-1-101817      | 17J0344-13   | Chloroform          | ND            | ug/L  | 0.03 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| GW-5E8-1-101817      | 17J0344-15   | Chloroform          | 0.26          | ug/L  | 0.03 | 0.10 | J                    | U                         | Detected in equipment blank   | Detected at 0.26 ug/L                         | False positive                 |
| EB-101817            | 17J0344-21   | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Chloroform          | 0.26          | ug/L  | 0.03 | 0.10 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| GW-4F1-2-101817      | 17J0344-23   | Tetrachloroethylene | 0.17          | ug/L  | 0.09 | 0.20 | J                    | J                         | Concentration is >MDL, <RL and laboratory noted air bubbles present in all sample containers  | NA  | Low or high                    |
|                      |  | Chloroform          | 0.26          | ug/L  | 0.05 | 0.20 | J                    | UJ                        | Detected in equipment blank and laboratory noted air bubbles present in all sample containers | Detected at 0.26 ug/L and NA                  | False positive                 |
|                      |  | Trichloroethylene   | ND            | ug/L  | 0.10 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | ND            | ug/L  | 0.11 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| GW-4F1-2-101817-(01) | 17J0344-25   | Chloroform          | 0.26          | ug/L  | 0.05 | 0.20 | J                    | UJ                        | Detected in equipment blank and laboratory noted air bubbles present in all sample containers | Detected at 0.26 ug/L and NA                  | False positive                 |
|                      |  | Tetrachloroethylene | 0.18          | ug/L  | 0.09 | 0.20 | J                    | J                         | Concentration is >MDL, <RL and laboratory noted air bubbles present in all sample containers  | NA  | Low or high                    |
|                      |  | Trichloroethylene   | ND            | ug/L  | 0.10 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | ND            | ug/L  | 0.11 | 0.20 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| GW-6E5-1-102017      | 17J0394-08   | Trichloroethylene   | 0.11          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL  | NA  | Low or high                    |
| GW-6F1-2-102017      | 17J0394-09   | Chloroform          | ND            | ug/L  | 0.03 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| GW-6F2-1-102017      | 17J0394-10   | Chloroform          | 0.03          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL  | NA  | Low or high                    |
| GW-5G1-1-102017      | 17J0394-11   | Chloroform          | ND            | ug/L  | 0.03 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| GW-5C21-2-102017     | 17J0394-13   | Chloroform          | 0.03          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL and laboratory noted air bubbles present in all sample containers  | NA  | Low or high                    |
|                      |  | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Trichloroethylene   | 0.27          | ug/L  | 0.05 | 0.10 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | 3.21          | ug/L  | 0.06 | 0.10 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| GW-7F2-1-102317      | 17J0430-01   | Tetrachloroethylene | 0.09          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL  | NA  | Low or high                    |
|                      |  | Chloroform          | 10.1          | ug/L  | 0.03 | 0.10 | J                    | U                         | Detected in trip blank and the equipment blank  | Detected at 10.1 ug/L (highest concentration) | False positive                 |
| GW-7E9-2-102317      | 17J0430-09   | Chloroform          | 12.2          | ug/L  | 0.03 | 0.10 |                      | U                         | Detected in trip blank and the equipment blank  | Detected at 10.1 ug/L (highest concentration) | False positive                 |
| GW-7E10-1-102317     | 17J0430-11RE1<br>17J0430-11RE1<br>17J0430-11RE2<br>17J0430-11RE2 | Vinyl Chloride      | 359           | ug/L  | 2.86 | 5.00 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Trichloroethylene   | 714           | ug/L  | 2.45 | 5.00 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Chloroform          | 36900         | ug/L  | 13.7 | 50.0 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
|                      |  | Tetrachloroethylene | 5190          | ug/L  | 23.7 | 50.0 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                 | NA  | Low or high                    |
| EB-102317            | 17J0430-17   | Chloroform          | 0.05          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL  | NA  | Low or high                    |
| Trip Blanks          | 17J0430-19   | Trichloroethylene   | 0.13          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL  | NA  | Low or high                    |
|                      |  | Vinyl Chloride      | 0.07          | ug/L  | 0.06 | 0.10 | J                    | J                         | Concentration is >MDL, <RL  | NA  | Low or high                    |
| GW-6E6-1-102417      | 17J0453-09   | Trichloroethylene   | 1.44          | ug/L  | 0.49 | 1.00 | J                    | J                         | Concentration is >MDL, <RL  | NA  | Low or high                    |
|                      |  | Chloroform          | 0.63          | ug/L  | 0.27 | 1.00 | J                    | J                         | Concentration is >MDL, <RL  | NA  | Low or high                    |

Table 2, continued

| Sample Number*          | Laboratory Sample Number | Chemical            | Concentration | Units | MDL  | RL   | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result | Possible Bias <sup>b,c,d</sup> |
|-------------------------|--------------------------|---------------------|---------------|-------|------|------|----------------------|---------------------------|--|------------------------|--------------------------------|
| GW-7E3-1-102417         | 17J0453-11               | Chloroform          | 0.14          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-6B19-2-102417        | 17J0453-13               | Chloroform          | 0.06          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL and laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                         |                          | Trichloroethylene   | 0.46          | ug/L  | 0.05 | 0.10 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Vinyl Chloride      | 0.63          | ug/L  | 0.06 | 0.10 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Tetrachloroethylene | 0.82          | ug/L  | 0.05 | 0.10 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
| GW-6B19-2-102417-(01)   | 17J0453-15               | Chloroform          | 0.05          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-6D25-2-102417        | 17J0453-17               | Chloroform          | 0.05          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-6G3-2-102517         | 17J0479-01               | Tetrachloroethylene | 0.08          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL and laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                         |                          | Chloroform          | 0.03          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL and laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                         |                          | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
| GW-6E1-1-102517         | 17J0479-09               | Chloroform          | 0.14          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-6E9-2-102517         | 17J0479-11               | Trichloroethylene   | 0.49          | ug/L  | 0.24 | 0.50 | J                    | J                         | Concentration is >MDL, <RL and laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                         |                          | Chloroform          | ND            | ug/L  | 0.14 | 0.50 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Tetrachloroethylene | ND            | ug/L  | 0.24 | 0.50 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Vinyl Chloride      | 4.50          | ug/L  | 0.29 | 0.50 |                      | J                         | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
| GW-5D2-1R-102517        | 17J0479-13               | Tetrachloroethylene | 0.45          | ug/L  | 0.24 | 0.50 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-7I3-2-102717         | 17J0529-05               | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Chloroform          | ND            | ug/L  | 0.03 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
| GW-8H1-1-102717         | 17J0529-07               | Chloroform          | ND            | ug/L  | 0.27 | 1.00 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Tetrachloroethylene | ND            | ug/L  | 0.47 | 1.00 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Trichloroethylene   | ND            | ug/L  | 0.49 | 1.00 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Vinyl Chloride      | ND            | ug/L  | 0.57 | 1.00 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
| GW-7G1-1-102717         | 17J0529-11               | Tetrachloroethylene | 0.12          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
|                         |                          | Chloroform          | 0.05          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-129+65-0-103017      | 17J0562-03               | Chloroform          | 0.04          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-128+30-2-103017      | 17J0562-07               | Trichloroethylene   | 0.06          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-126+90-2-103017      | 17J0562-11               | Trichloroethylene   | 0.09          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-125+50-2-103017      | 17J0562-13               | Trichloroethylene   | 0.17          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-124+00-2-103017      | 17J0562-15               | Vinyl Chloride      | 0.93          | ug/L  | 0.57 | 1.00 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-125+50-1-103117      | 17J0578-01               | Chloroform          | 0.03          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-126+90-0-103117      | 17J0578-03               | Chloroform          | 0.03          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-124+00-1-103117      | 17J0578-07               | Trichloroethylene   | 0.16          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL   | NA                     | Low or high                    |
| GW-126+90-3-103117      | 17J0578-11               | Chloroform          | ND            | ug/L  | 0.03 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
| GW-126+90-3-103117-(01) | 17J0578-13               | Tetrachloroethylene | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Chloroform          | ND            | ug/L  | 0.03 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Vinyl Chloride      | ND            | ug/L  | 0.06 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |
|                         |                          | Trichloroethylene   | ND            | ug/L  | 0.05 | 0.10 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers                                | NA                     | Low or high                    |

Table 2, continued

| Sample Number*     | Laboratory Sample Number | Chemical            | Concentration | Units | MDL  | RL   | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason  | Quality Control Result | Possible Bias <sup>b,c,d</sup> |
|--------------------|--------------------------|---------------------|---------------|-------|------|------|----------------------|---------------------------|---|------------------------|--------------------------------|
| GW-120+75-2-103117 | 17J0578-15               | Trichloroethylene   | ND            | ug/L  | 0.49 | 1.00 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                    |                          | Vinyl Chloride      | ND            | ug/L  | 0.57 | 1.00 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                    |                          | Chloroform          | ND            | ug/L  | 0.27 | 1.00 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                    |                          | Tetrachloroethylene | ND            | ug/L  | 0.47 | 1.00 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
| GW-129+65-1-103117 | 17K0014-01               | Chloroform          | 0.12          | ug/L  | 0.03 | 0.10 | J                    | U                         | Detected in equipment blank                                   | Detected at 0.12 ug/L  | False positive                 |
| GW-128+30-1-103117 | 17K0014-03               | Chloroform          | 0.12          | ug/L  | 0.03 | 0.10 | J                    | U                         | Detected in equipment blank                                   | Detected at 0.12 ug/L  | False positive                 |
| GW-5D1-3-110117    | 17K0014-23               | Chloroform          | ND            | ug/L  | 0.14 | 0.50 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                    |                          | Tetrachloroethylene | ND            | ug/L  | 0.24 | 0.50 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                    |                          | Trichloroethylene   | ND            | ug/L  | 0.24 | 0.50 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
|                    |                          | Vinyl Chloride      | ND            | ug/L  | 0.29 | 0.50 | U                    | UJ                        | Laboratory noted air bubbles present in all sample containers | NA                     | Low or high                    |
| EB-110117          | 17K0014-27               | Chloroform          | 0.12          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-126+90-1-110217 | 17K0038-03               | Chloroform          | 0.06          | ug/L  | 0.03 | 0.10 | J                    | U                         | Detected in equipment blank                                   | Detected at 0.06 ug/L  | False positive                 |
| EB-110217          | 17K0038-13               | Chloroform          | 0.06          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-7E5-3-110217    | 17K0038-15               | Chloroform          | 0.03          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-121+80-1-110317 | 17K0066-01               | Chloroform          | 0.06          | ug/L  | 0.03 | 0.10 | J                    | U                         | Detected in equipment blank                                   | Detected at 0.06 ug/L  | False positive                 |
| GW-129+65-3-110317 | 17K0066-15               | Tetrachloroethylene | 0.18          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-131+00-3-110317 | 17K0066-17               | Tetrachloroethylene | 0.13          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| GW-1C1-3-110317    | 17K0066-19               | Tetrachloroethylene | 0.10          | ug/L  | 0.05 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |
| EB-110317          | 17K0066-21               | Chloroform          | 0.06          | ug/L  | 0.03 | 0.10 | J                    | J                         | Concentration is >MDL, <RL                                    | NA                     | Low or high                    |

Notes:  
D- reported value is from a dilution  
E - concentration exceeds calibration range  
H- holding time not met  
J - estimated  
LCS - laboratory control sample  
MDL - method detection limit  
MS - matrix spike  
R - rejected  
RE1, RE2, RE3 - reanalysis (1,2, or 3)  
RL - reporting limit  
RPD - relative percent differences  
U - undetected at detection limit shown

|                                |     |
|--------------------------------|-----|
| Total results qualified "J" =  | 287 |
| Total results qualified "U" =  | 9   |
| Total results qualified "UJ" = | 147 |
| Total results qualified "R" =  | 23  |

<sup>a</sup> Summary of qualified data is for natural and field quality control samples only

<sup>b</sup>Low bias - concentration reported is exhibits low bias and the actual reporting limit or concentration may be greater than reported

<sup>c</sup>High bias - result reported exhibits high bias and the actual reporting limit or concentration may be lower than reported

<sup>d</sup>False positive - compound is likely not present

<sup>\*</sup> Data users must note that only data considered reportable during data validation has been reported. In several instances, multiple reanalyses may have been completed.

<sup>\*</sup> Data users should note that significant figures in above table are "as reported by the laboratory"; no rounding to more appropriate significant figures was completed during data validation





05 December 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

17J0102

Associated SDG ID(s)

N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: 10/6/17  
 Page: 1 of 2  
 No. of Coolers: \_\_\_\_\_  
 Cooler Temps: \_\_\_\_\_

ARI Assigned Number: 1750102  
 Turn-around Requested: Normal  
 ARI Client Company: Pioneer Technologies  
 Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: DG Cooper 206-660-3466

| Sample ID                     | Date   | Time  | Matrix | No. Containers | Analysis Requested  |   |   |                                      |   |  | Notes/Comments |  |  |
|-------------------------------|--|-------|--------|----------------|---|---|---|--------------------------------------|---|--|----------------|--|--|
|                               |  |       |        |                | PCE, TCE, Vinyl chloride, Chloroform<br>EPA 8260C   | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite<br>EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B  |  |                |  |  |
| PW-119+25-ST1-100417          | 10-4-17  | 1130  | Water  | 3              | X   |   |   |                                      |   |  |                |  |  |
| PW-119+25-ST1-100417 (20)     | ↓  | 1130  |        | 4              | X   | X   |   |                                      | X   |  |                |  |  |
| PW-120+25-ST1-100517          | 10-5-17  | 0830  |        | 3              | X   |   |   |                                      |   |  |                |  |  |
| PW-120+25-ST1-100517 (20)     | ↓  | 0830  |        | 4              | X   | X   |   |                                      | X   |  |                |  |  |
| PW-123+25-ST1-100517          | 10-5-17  | 1015  |        | 3              | X   |   |   |                                      |   |  |                |  |  |
| PW-123+25-ST1-100517 (20)     | ↓  | 1015  |        | 4              | X   | X   |   |                                      | X   |  |                |  |  |
| PW-125+25-ST1-100517          | 10-5-17  | 1300  |        | 3              | X   |   |   |                                      |   |  |                |  |  |
| PW-125+25-ST1-100517 (20)     | ↓  | 1300  |        | 4              | X   | X   |   |                                      | X   |  |                |  |  |
| PW-126+80-ST1-100617          | 10-6-17  | 0830  |        | 3              | X   |   |   |                                      |   |  |                |  |  |
| PW-126+80-ST1-100617 (20)     | ↓  | 0830  |        | 4              | X   | X   |   |                                      | X   |  |                |  |  |
| PW-128+50-ST1-100617          | 10-6-17  | 10:00 |        | 3              | X   |   |   |                                      |   |  |                |  |  |
| Comments/Special Instructions | Reinquished by: (Signature) Luke<br>Printed Name: Luke Kernor<br>Company: DOF<br>Date & Time: 10/6/17 1325 |       |        |                | Reinquished by: (Signature) Stephen AM<br>Printed Name: Stephen AM<br>Company: ARI<br>Date & Time: 10/6/17 1325 |   |   |                                      | Received by: (Signature)<br>Printed Name:<br>Company:<br>Date & Time: |  |                |  |  |

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.









# Cooler Receipt Form

ARI Client: PIONEER

Project Name: Arkema FS DG Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 1750102

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time: 1325 2.8

If cooler temperature is out of compliance fill out form 00070F

Cooler Accepted by: SF Date: 10/6/17 Time: 1325 Temp Gun ID#: D002565

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO

Were all VOC vials free of air bubbles? ..... NA  YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI ..... NA 9/25/17

Was Sample Split by ARI :  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: B.H. Date: 10/6/17 Time: 14:16

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle  | Sample ID on COC       | Sample ID on Bottle | Sample ID on COC |
|----------------------|------------------------|---------------------|------------------|
| PW-128-75-STI-100617 | ↳ PW-130+75-STI-100617 |                     |                  |
|                      |                        |                     |                  |
|                      |                        |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**  
one vial of PW-120+75-STI-100517 missing sampling time/date.

By: B.H. Date: 10/6/17

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



WORK ORDER

17J0102

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: 79227

Preservation Confirmation

| Container ID | Container Type                    | pH      |
|--------------|-----------------------------------|---------|
| 17J0102-01 A | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-01 B | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-01 C | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-02 A | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0102-02 B | Small OJ, 500 mL                  |         |
| 17J0102-02 C | Small OJ, 500 mL                  |         |
| 17J0102-02 D | Large OJ, 1000 mL                 |         |
| 17J0102-03 A | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-03 B | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-03 C | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-04 A | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0102-04 B | Small OJ, 500 mL                  |         |
| 17J0102-04 C | Small OJ, 500 mL                  |         |
| 17J0102-04 D | Large OJ, 1000 mL                 |         |
| 17J0102-05 A | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-05 B | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-05 C | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-06 A | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0102-06 B | Small OJ, 500 mL                  |         |
| 17J0102-06 C | Small OJ, 500 mL                  |         |
| 17J0102-06 D | Large OJ, 1000 mL                 |         |
| 17J0102-07 A | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-07 B | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-07 C | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-08 A | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0102-08 B | Small OJ, 500 mL                  |         |
| 17J0102-08 C | Small OJ, 500 mL                  |         |
| 17J0102-08 D | Large OJ, 1000 mL                 |         |
| 17J0102-09 A | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-09 B | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0102-09 C | VOA Vial, Clear, 40 mL, HCL       |         |

Reviewed By B.H.

Date 10/6/17





WORK ORDER

17J0102

|  |                                   |                                    |
|--|-----------------------------------|------------------------------------|
| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: 79227              |
| 17J0102-10 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass                            |
| 17J0102-10 B   | Small OJ, 500 mL                  |                                    |
| 17J0102-10 C   | Small OJ, 500 mL                  |                                    |
| 17J0102-10 D   | Large OJ, 1000 mL                 |                                    |
| 17J0102-11 A   | VOA Vial, Clear, 40 mL, HCL       |                                    |
| 17J0102-11 B   | VOA Vial, Clear, 40 mL, HCL       |                                    |
| 17J0102-11 C   | VOA Vial, Clear, 40 mL, HCL       |                                    |
| 17J0102-12 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass                            |
| 17J0102-12 B   | Small OJ, 500 mL                  |                                    |
| 17J0102-12 C   | Small OJ, 500 mL                  |                                    |
| 17J0102-12 D   | Large OJ, 1000 mL                 |                                    |
| 17J0102-13 A   | VOA Vial, Clear, 40 mL, HCL       |                                    |
| 17J0102-13 B   | VOA Vial, Clear, 40 mL, HCL       |                                    |
| 17J0102-13 C   | VOA Vial, Clear, 40 mL, HCL       |                                    |
| 17J0102-14 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass                            |
| 17J0102-14 B   | Small OJ, 500 mL                  |                                    |
| 17J0102-14 C   | Small OJ, 500 mL                  |                                    |
| 17J0102-14 D   | Large OJ, 1000 mL                 |                                    |
| 17J0102-15 A   | VOA Vial, Clear, 40 mL, HCL       |                                    |
| 17J0102-15 B   | VOA Vial, Clear, 40 mL, HCL       |                                    |
| 17J0102-15 C   | VOA Vial, Clear, 40 mL, HCL       |                                    |

B.H.  
Preservation Confirmed By

10/6/17  
Date

B.H.  
Reviewed By

10/6/17  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                 | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|---------------------------|---------------|--------|-------------------|-------------------|
| PW-119+25-ST1-100417      | 17J0102-01    | Water  | 04-Oct-2017 11:30 | 06-Oct-2017 13:25 |
| PW-119+25-ST1-100417-(20) | 17J0102-02    | Water  | 04-Oct-2017 11:30 | 06-Oct-2017 13:25 |
| PW-120+75-ST1-100517      | 17J0102-03    | Water  | 05-Oct-2017 08:30 | 06-Oct-2017 13:25 |
| PW-120+75-ST1-100517-(20) | 17J0102-04    | Water  | 05-Oct-2017 08:30 | 06-Oct-2017 13:25 |
| PW-123+25-ST1-100517      | 17J0102-05    | Water  | 05-Oct-2017 10:15 | 06-Oct-2017 13:25 |
| PW-123+25-ST1-100517-(20) | 17J0102-06    | Water  | 05-Oct-2017 10:15 | 06-Oct-2017 13:25 |
| PW-125+00-ST1-100517      | 17J0102-07    | Water  | 05-Oct-2017 13:00 | 06-Oct-2017 13:25 |
| PW-125+00-ST1-100517-(20) | 17J0102-08    | Water  | 05-Oct-2017 13:00 | 06-Oct-2017 13:25 |
| PW-126+80-ST1-100617      | 17J0102-09    | Water  | 06-Oct-2017 08:30 | 06-Oct-2017 13:25 |
| PW-126+80-ST1-100617-(20) | 17J0102-10    | Water  | 06-Oct-2017 08:30 | 06-Oct-2017 13:25 |
| PW-128+50-ST1-100617      | 17J0102-11    | Water  | 06-Oct-2017 10:00 | 06-Oct-2017 13:25 |
| PW-128+50-ST1-100617-(20) | 17J0102-12    | Water  | 06-Oct-2017 10:00 | 06-Oct-2017 13:25 |
| PW-130+75-ST1-100617      | 17J0102-13    | Water  | 06-Oct-2017 11:30 | 06-Oct-2017 13:25 |
| PW-130+75-ST1-100617-(20) | 17J0102-14    | Water  | 06-Oct-2017 11:30 | 06-Oct-2017 13:25 |
| TB-TB-01-100617           | 17J0102-15    | Water  | 04-Oct-2017 00:00 | 06-Oct-2017 13:25 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 6, 2017 under ARI workorder 17J0102. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Anions - EPA Method 300.0

Select samples were received outside of holding time, and some were reanalyzed at a 100x dilution outside of the 48hr Nitrate, Nitrite, O-phos recommended holding time. These samples have been flagged with an "H" qualifier.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample PW-119+25-STI-100417(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

### Dissolved Organic Carbon - Method SM5310

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample PW-119+25-STI-100417(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

### Total Dissolved Solids - EPA Method 160.1



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample PW-119+25-STI-100417(20). The duplicate RPD was within QC limits.

#### Alkalinity - Method SM2320

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample PW-119+25-STI-100417(20). The duplicate RPD was within QC limits.





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**PW-119+25-ST1-100417**  
**17J0102-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/04/2017 11:30  
Analyzed: 10-Oct-2017 16:32

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0254 Sample Size: 10 mL  
Prepared: 10-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 109 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.7 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.8 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105 %  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**PW-119+25-ST1-100417-(20)**  
**17J0102-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/04/2017 11:30  
Analyzed: 11-Oct-2017 07:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0281 Sample Size: 5 mL  
Prepared: 11-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26600</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**PW-119+25-ST1-100417-(20)**  
**17J0102-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 11:30  
Analyzed: 07-Oct-2017 10:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190  
Prepared: 06-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | <b>41.9</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | H, U  |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**PW-119+25-ST1-100417-(20)**  
**17J0102-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/04/2017 11:30

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 10:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0292  
Prepared: 11-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 488    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 488    | mg/L CaCO3 |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-119+25-ST1-100417-(20)**  
**17J0102-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/04/2017 11:30  
Analyzed: 09-Oct-2017 17:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0227 Sample Size: 20 mL  
Prepared: 09-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>10.4</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-119+25-ST1-100417-(20)**  
**17J0102-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 11:30  
Analyzed: 07-Oct-2017 13:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | H, U  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>1780</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:26

**PW-119+25-ST1-100417-(20)**  
**17J0102-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 11:30  
Analyzed: 07-Oct-2017 15:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>18000</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**PW-120+75-ST1-100517**  
**17J0102-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/05/2017 08:30  
Analyzed: 10-Oct-2017 16:58

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0254 Sample Size: 10 mL  
Prepared: 10-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 105 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 98.0 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102 %  |       |





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Olympia WA, 98503

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**Reported:**  
05-Dec-2017 12:26

**PW-120+75-ST1-100517-(20)**  
**17J0102-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/05/2017 08:30  
Analyzed: 11-Oct-2017 07:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0281 Sample Size: 5 mL  
Prepared: 11-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>22700</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-120+75-ST1-100517-(20)**  
**17J0102-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 08:30  
Analyzed: 07-Oct-2017 11:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190  
Prepared: 06-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | 25.3   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | H, U  |



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Reported:  
05-Dec-2017 12:26

**PW-120+75-ST1-100517-(20)**  
**17J0102-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/05/2017 08:30  
Analyzed: 11-Oct-2017 10:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0292 Sample Size: 100 mL  
Prepared: 11-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 917    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 917    | mg/L CaCO3 |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-120+75-ST1-100517-(20)**  
**17J0102-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/05/2017 08:30  
Analyzed: 09-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0227 Sample Size: 20 mL  
Prepared: 09-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>21.8</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-120+75-ST1-100517-(20)**  
**17J0102-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 08:30  
Analyzed: 07-Oct-2017 14:08

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | H, U  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>866</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:26

**PW-120+75-ST1-100517-(20)**  
**17J0102-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 08:30  
Analyzed: 07-Oct-2017 17:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>14200</b> | mg/L  | D     |



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Reported:  
05-Dec-2017 12:26

**PW-123+25-ST1-100517**  
**17J0102-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/05/2017 10:15  
Analyzed: 10-Oct-2017 17:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0254 Sample Size: 10 mL  
Prepared: 10-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 106   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 98.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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**Reported:**  
05-Dec-2017 12:26

**PW-123+25-ST1-100517-(20)**  
**17J0102-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/05/2017 10:15  
Analyzed: 11-Oct-2017 07:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0281 Sample Size: 5 mL  
Prepared: 11-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>25700</b> | mg/L  |       |





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**Reported:**  
05-Dec-2017 12:26

**PW-123+25-ST1-100517-(20)**  
**17J0102-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 10:15  
Analyzed: 07-Oct-2017 10:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190  
Prepared: 06-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | <b>48.2</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |



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Reported:  
05-Dec-2017 12:26

**PW-123+25-ST1-100517-(20)**  
**17J0102-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/05/2017 10:15

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 10:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0292  
Prepared: 11-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>109</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>109</b> | mg/L CaCO3 |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-123+25-ST1-100517-(20)**  
**17J0102-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/05/2017 10:15  
Analyzed: 09-Oct-2017 19:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0227 Sample Size: 20 mL  
Prepared: 09-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>1.84</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-123+25-ST1-100517-(20)**  
**17J0102-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 10:15  
Analyzed: 07-Oct-2017 14:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | H, U  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>2290</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:26

**PW-123+25-ST1-100517-(20)**  
**17J0102-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 10:15  
Analyzed: 07-Oct-2017 17:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>16700</b> | mg/L  | D     |



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Reported:  
05-Dec-2017 12:26

**PW-125+00-ST1-100517**  
**17J0102-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/05/2017 13:00  
Analyzed: 10-Oct-2017 17:48

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0254 Sample Size: 10 mL  
Prepared: 10-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 103   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 101   | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.5  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |



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**Reported:**  
05-Dec-2017 12:26

**PW-125+00-ST1-100517-(20)**  
**17J0102-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/05/2017 13:00  
Analyzed: 11-Oct-2017 07:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0281 Sample Size: 5 mL  
Prepared: 11-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>25100</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-125+00-ST1-100517-(20)**  
**17J0102-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 13:00  
Analyzed: 07-Oct-2017 10:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190  
Prepared: 06-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | <b>44.6</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**PW-125+00-ST1-100517-(20)**  
**17J0102-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/05/2017 13:00  
Analyzed: 11-Oct-2017 10:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0292 Sample Size: 100 mL  
Prepared: 11-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 131    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 131    | mg/L CaCO3 |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**PW-125+00-ST1-100517-(20)**  
**17J0102-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/05/2017 13:00  
Analyzed: 09-Oct-2017 19:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0227 Sample Size: 20 mL  
Prepared: 09-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>1.51</b> | mg/L  |       |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**PW-125+00-ST1-100517-(20)**  
**17J0102-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 13:00  
Analyzed: 07-Oct-2017 14:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | H, U  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>2140</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**PW-125+00-ST1-100517-(20)**  
**17J0102-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/05/2017 13:00  
Analyzed: 07-Oct-2017 17:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>15900</b> | mg/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**PW-126+80-ST1-100617**  
**17J0102-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/06/2017 08:30  
Analyzed: 10-Oct-2017 18:14

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0254 Sample Size: 10 mL  
Prepared: 10-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 105   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 101   | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.0  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**PW-126+80-ST1-100617-(20)**  
**17J0102-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/06/2017 08:30  
Analyzed: 11-Oct-2017 07:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0281 Sample Size: 5 mL  
Prepared: 11-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26800</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-126+80-ST1-100617-(20)**  
**17J0102-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 08:30  
Analyzed: 07-Oct-2017 11:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190  
Prepared: 06-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | 49.5   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |



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Reported:  
05-Dec-2017 12:26

**PW-126+80-ST1-100617-(20)**  
**17J0102-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/06/2017 08:30  
Analyzed: 11-Oct-2017 10:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0292 Sample Size: 100 mL  
Prepared: 11-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |





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**Reported:**  
05-Dec-2017 12:26

**PW-126+80-ST1-100617-(20)**  
**17J0102-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/06/2017 08:30  
Analyzed: 09-Oct-2017 20:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0227 Sample Size: 20 mL  
Prepared: 09-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>1.18</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-126+80-ST1-100617-(20)**  
**17J0102-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 08:30  
Analyzed: 07-Oct-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>2360</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:26

**PW-126+80-ST1-100617-(20)**  
**17J0102-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 08:30  
Analyzed: 07-Oct-2017 18:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>17100</b> | mg/L  | D     |



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Reported:  
05-Dec-2017 12:26

**PW-128+50-ST1-100617**  
**17J0102-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/06/2017 10:00  
Analyzed: 10-Oct-2017 18:39

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0254 Sample Size: 10 mL  
Prepared: 10-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 103   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.7  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 98.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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**Reported:**  
05-Dec-2017 12:26

**PW-128+50-ST1-100617-(20)**  
**17J0102-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/06/2017 10:00  
Analyzed: 11-Oct-2017 07:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0281 Sample Size: 5 mL  
Prepared: 11-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26200</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-128+50-ST1-100617-(20)**  
**17J0102-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 10:00  
Analyzed: 07-Oct-2017 12:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | 49.2   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |



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Reported:  
05-Dec-2017 12:26

**PW-128+50-ST1-100617-(20)**  
**17J0102-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/06/2017 10:00  
Analyzed: 11-Oct-2017 10:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0292 Sample Size: 100 mL  
Prepared: 11-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>104</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>104</b> | mg/L CaCO3 |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-128+50-ST1-100617-(20)**  
**17J0102-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/06/2017 10:00  
Analyzed: 09-Oct-2017 20:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0227 Sample Size: 20 mL  
Prepared: 09-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>1.31</b> | mg/L  |       |





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**Reported:**  
05-Dec-2017 12:26

**PW-128+50-ST1-100617-(20)**  
**17J0102-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 10:00  
Analyzed: 07-Oct-2017 15:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>2300</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:26

**PW-128+50-ST1-100617-(20)**  
**17J0102-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 10:00  
Analyzed: 07-Oct-2017 18:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>16800</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**PW-130+75-ST1-100617**  
**17J0102-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/06/2017 11:30  
Analyzed: 10-Oct-2017 19:05

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0254 Sample Size: 10 mL  
Prepared: 10-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 102   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 101   | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |



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**Reported:**  
05-Dec-2017 12:26

**PW-130+75-ST1-100617-(20)**  
**17J0102-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/06/2017 11:30  
Analyzed: 11-Oct-2017 07:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0281 Sample Size: 5 mL  
Prepared: 11-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26700</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**PW-130+75-ST1-100617-(20)**  
**17J0102-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 11:30  
Analyzed: 07-Oct-2017 12:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | <b>50.6</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**PW-130+75-ST1-100617-(20)**  
**17J0102-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/06/2017 11:30  
Analyzed: 11-Oct-2017 10:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0292 Sample Size: 100 mL  
Prepared: 11-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1040</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1040</b> | mg/L CaCO3 |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-130+75-ST1-100617-(20)**  
**17J0102-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/06/2017 11:30  
Analyzed: 09-Oct-2017 20:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0227 Sample Size: 20 mL  
Prepared: 09-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>1.24</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:26

**PW-130+75-ST1-100617-(20)**  
**17J0102-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 11:30  
Analyzed: 07-Oct-2017 15:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>2330</b> | mg/L  | D     |





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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**PW-130+75-ST1-100617-(20)**  
**17J0102-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/06/2017 11:30  
Analyzed: 07-Oct-2017 18:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0190 Sample Size: 5 mL  
Prepared: 06-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>17000</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**TB-TB-01-100617**  
**17J0102-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/04/2017 00:00  
Analyzed: 10-Oct-2017 11:42

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0254 Sample Size: 10 mL  
Prepared: 10-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 96.9 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 101 %  |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 99.7 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 95.7 % |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

### Volatile Organic Compounds - Quality Control

#### Batch BFJ0254 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0254-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 11:16 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 4.89   |                 |                 | ug/L  | 5.00        |   | 97.8 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.03   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.86   |                 |                 | ug/L  | 5.00        |   | 97.3 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.05   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS (BFJ0254-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 09:32 |      |             |      |           |       |
| Vinyl Chloride                    | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      |      |           |       |
| Chloroform                        | 10.3   | 0.03            | 0.20            | ug/L  | 10.0        |   | 103  | 80-122      |      |           |       |
| Trichloroethene                   | 9.99   | 0.05            | 0.20            | ug/L  | 10.0        |   | 99.9 | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.4   | 0.05            | 0.20            | ug/L  | 10.0        |   | 104  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 5.01   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.76   |                 |                 | ug/L  | 5.00        |   | 95.2 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.08   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.95   |                 |                 | ug/L  | 5.00        |   | 99.1 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.86   |                 |                 | ug/L  | 5.00        |   | 97.3 | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0254-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 09:58 |      |             |      |           |       |
| Vinyl Chloride                    | 10.2   | 0.06            | 0.20            | ug/L  | 10.0        |   | 102  | 66-133      | 1.00 | 30        |       |
| Chloroform                        | 10.4   | 0.03            | 0.20            | ug/L  | 10.0        |   | 104  | 80-122      | 1.58 | 30        |       |
| Trichloroethene                   | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      | 0.59 | 30        |       |
| Tetrachloroethene                 | 10.4   | 0.05            | 0.20            | ug/L  | 10.0        |   | 104  | 80-120      | 0.45 | 30        |       |
| Surrogate: Dibromofluoromethane   | 5.12   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.79   |                 |                 | ug/L  | 5.00        |   | 95.7 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.03   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.94   |                 |                 | ug/L  | 5.00        |   | 98.9 | 80-120      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

Wet Chemistry - Quality Control

Batch BFJ0190 - No Prep Wet Chem

Instrument: DX500 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0190-BLK1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 20:08                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| <b>LCS (BFJ0190-BS1)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 20:25                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.45   | 0.100           | mg/L   | 1.50        |               | 96.5 | 75-125      |      |           |       |
| Chloride  | 1.51   | 0.100           | mg/L   | 1.50        |               | 100  | 75-125      |      |           |       |
| Fluoride  | 1.51   | 0.100           | mg/L   | 1.50        |               | 101  | 75-125      |      |           |       |
| Nitrate-N   | 1.51   | 0.100           | mg-N/L | 1.50        |               | 100  | 75-125      |      |           |       |
| Nitrite-N   | 1.48   | 0.100           | mg-N/L | 1.50        |               | 98.8 | 75-125      |      |           |       |
| Orthophosphorus   | 1.50   | 0.10            | mg-P/L | 1.50        |               | 99.7 | 75-125      |      |           |       |
| Sulfate   | 1.53   | 0.100           | mg/L   | 1.50        |               | 102  | 75-125      |      |           |       |
| <b>Duplicate (BFJ0190-DUP2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0102-02 Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 11:04    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 41.7   | 10.0            | mg/L   |             | 41.9          |      |             | 0.65 | 20        | D     |
| Fluoride  | ND     | 10.0            | mg/L   |             | ND            |      |             |      |           | U     |
| Nitrate-N   | ND     | 10.0            | mg-N/L |             | ND            |      |             |      |           | H, U  |
| Orthophosphorus   | ND     | 10.0            | mg-P/L |             | ND            |      |             |      |           | H, U  |
| <b>Duplicate (BFJ0190-DUP3)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0102-02RE1 Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 13:35 |        |                 |        |             |               |      |             |      |           |       |
| Nitrite-N   | ND     | 50.0            | mg-N/L |             | ND            |      |             |      |           | U     |
| Sulfate   | 1780   | 50.0            | mg/L   |             | 1780          |      |             | 0.28 | 20        | D     |
| <b>Duplicate (BFJ0190-DUP4)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0102-02RE2 Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 16:39 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 18000  | 1000            | mg/L   |             | 18000         |      |             | 0.35 | 20        | D     |
| <b>Duplicate (BFJ0190-DUP5)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0102-02RE2 Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 16:56 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 18000  | 1000            | mg/L   |             | 18000         |      |             | 0.41 | 20        | D     |
| <b>Matrix Spike (BFJ0190-MS2)</b>                                       |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0102-02 Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 11:20    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 57.8   | 10.0            | mg/L   | 20.0        | 41.9          | 79.3 | 75-125      |      |           | D     |
| Fluoride  | 15.7   | 10.0            | mg/L   | 20.0        | ND            | 78.7 | 75-125      |      |           | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**Wet Chemistry - Quality Control**

**Batch BFJ0190 - No Prep Wet Chem**

Instrument: DX500 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit           | Units  | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|--------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0190-MS2)</b> |        | <b>Source: 17J0102-02</b> |        | Prepared: 06-Oct-2017 |               | Analyzed: 07-Oct-2017 11:20 |             |     |           |       |
| Nitrate-N                         | 20.0   | 10.0                      | mg-N/L | 20.0                  | ND            | 99.9                        | 75-125      |     |           | H, D  |
| Orthophosphorus                   | 20.6   | 10.0                      | mg-P/L | 20.0                  | ND            | 103                         | 75-125      |     |           | H, D  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                              |        |                       |    |                             |        |  |  |   |
|-----------------------------------|------|------------------------------|--------|-----------------------|----|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFJ0190-MS3)</b> |      | <b>Source: 17J0102-02RE1</b> |        | Prepared: 06-Oct-2017 |    | Analyzed: 07-Oct-2017 13:51 |        |  |  |   |
| Nitrite-N                         | 56.1 | 50.0                         | mg-N/L | 50.0                  | ND | 112                         | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

Wet Chemistry - Quality Control

Batch BFJ0227 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte                   | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-------------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0227-BLK1)</b>         |        |                           |       |             |   |      |             |      |           |       |
|                                     |        |                           |       |             | Prepared: 09-Oct-2017 Analyzed: 09-Oct-2017 17:02 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50                      | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0227-BS1)</b>            |        |                           |       |             |   |      |             |      |           |       |
|                                     |        |                           |       |             | Prepared: 09-Oct-2017 Analyzed: 09-Oct-2017 16:15 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 20.8   | 0.50                      | mg/L  | 20.0        |   | 104  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0227-DUP1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                     |        | <b>Source: 17J0102-02</b> |       |             | Prepared: 09-Oct-2017 Analyzed: 09-Oct-2017 17:45 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 10.5   | 0.50                      | mg/L  |             | 10.4  |      |             | 0.48 | 20        |       |
| <b>Matrix Spike (BFJ0227-MS1)</b>   |        |                           |       |             |   |      |             |      |           |       |
|                                     |        | <b>Source: 17J0102-02</b> |       |             | Prepared: 09-Oct-2017 Analyzed: 09-Oct-2017 18:05 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 29.5   | 0.50                      | mg/L  | 20.0        | 10.4  | 95.3 | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:26

**Wet Chemistry - Quality Control**

**Batch BFJ0281 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0281-BLK1)</b>     |        |                 |       |             | Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 07:58                    |      |             |       |           |       |
| Dissolved Solids                | ND     | 5.0             | mg/L  |             |  |      |             |       |           | U     |
| <b>LCS (BFJ0281-BS1)</b>        |        |                 |       |             | Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 07:58                    |      |             |       |           |       |
| Dissolved Solids                | 512    | 5.0             | mg/L  | 500         |  | 102  | 90-110      |       |           |       |
| <b>Duplicate (BFJ0281-DUP1)</b> |        |                 |       |             | Source: 17J0102-02 Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 07:58 |      |             |       |           |       |
| Dissolved Solids                | 30700  | 200             | mg/L  |             | 26600  |      |             | 14.10 | 20        |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:26

**Wet Chemistry - Quality Control**

**Batch BFJ0292 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte  | Result | Reporting Limit | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|--|--------|-----------------|------------|-------------|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0292-BLK1)</b>  |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 10:27                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Blank (BFJ0292-BLK2)</b>  |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 13:55                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Duplicate (BFJ0292-DUP1)</b>                                      |        |                 |            |             |               |      |              |      |           |       |
| Source: 17J0102-02 Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 10:27 |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | 486    | 1.00            | mg/L CaCO3 |             | 488           |      |              | 0.51 | 20        |       |
| <b>Reference (BFJ0292-SRM1)</b>                                      |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 10:27                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | 105    | 1.00            | mg/L CaCO3 | 108         |               | 96.9 | 90.37-108.33 |      |           |       |





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### Certified Analyses included in this Report

| Analyte                               | Certifications                  |
|---------------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>             |                                 |
| Bromide                               | DoD-ELAP,WADOE,NELAP            |
| Chloride                              | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                              | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                             | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                             | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                       | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                               | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 8260C in Water</b>             |                                 |
| Chloromethane                         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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|                             |                                 |
|-----------------------------|---------------------------------|
| Trichloroethene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone        | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene           | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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|                          |                                 |
|--------------------------|---------------------------------|
| 1,2,4-Trichlorobenzene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                 | WADOE                           |
| 2-Pentanone              | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |

**SM 5310 B-00 in Water**

|                          |                   |
|--------------------------|-------------------|
| Dissolved Organic Carbon | WADOE,WA-DW,NELAP |
|--------------------------|-------------------|

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



30 October 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

17J0197

Associated SDG ID(s)

N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 1750197  
 Turn-around Requested: Normal  
 ARI Client Company: Pioneer Technologies  
 Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: DG Cooper 206-660-3466

Date: 10/11/17  
 Page: 1 of 3  
 No. of Coolers: 1  
 Cooler Temps: Tempis

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID                     | Date   | Time   | Matrix  | No. Containers  | Analysis Requested                          |  |  |   |  |  |                                      |                            | Notes/Comments  |
|-------------------------------|--|--|---|---|---|--|--|---|--|--|--------------------------------------|----------------------------|---|
|                               |  |  |   |   | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Nitrate,<br>Chloride, Fluoride, Nitrate,<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |   |
| GW-306-1R-101117-45-98        | 10/11/17   | 0945   | water   | 4   | X   | X  | X  | X   | X  | X  | X                                    | X                          | Dissolved<br>Samples are<br>field filtered<br>0.45 um |
| GW-306-1R-101117-45-95-20     | 10/11/17   | 0945   |   | 5   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| GW-307-2R-101117-24.3-29.5    | 10/11/17   | 1030   |   | 4   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| GW-307-2R-101117-24.3-29.5-20 |  | 1030   |   | 5   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| GW-202-2-101117-20.6-25.6     |  | 1330   |   | 4   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| GW-202-2-101117-20.6-25.6-20  |  | 1330   |   | 5   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| GW-201-1R-101117-5.1-10.1-20  |  | 1345   |   | 5   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| W-201-1R-101117-5.1-10.1      |  | 1345   |   | 4   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| W-102-2-101117-13.8-23.6      |  | 1500   |   | 4   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| W-102-2-101117-13.8-23.6-20   |  | 1500   |   | 5   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| W-103-1-101117-3.5-8.5        |  | 1530   |   | 4   | X   | X  | X  | X   | X  | X  | X                                    | X                          |   |
| Comments/Special Instructions | Relinquished by: <u>[Signature]</u><br>Printed Name: <u>Stephanie Fism</u><br>Company: <u>ARI</u><br>Date & Time: <u>10/12/17 1740</u> | Received by: <u>[Signature]</u><br>Printed Name: <u>Stephanie Fism</u><br>Company: <u>ARI</u><br>Date & Time: <u>10/12/17 1740</u> | Relinquished by: <u>[Signature]</u><br>Printed Name: <u>[Signature]</u><br>Company: <u>[Company]</u><br>Date & Time: <u>[Date &amp; Time]</u> | Received by: <u>[Signature]</u><br>Printed Name: <u>[Signature]</u><br>Company: <u>[Company]</u><br>Date & Time: <u>[Date &amp; Time]</u> |   |  |  |   |  |  |                                      |                            |   |

**imits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**ample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 1750197  
 Turn-around Requested: Normal  
 ARI Client Company: Pioneer Technologies  
 Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: DG Cooper 206-660-3466

Date: 10/11/17  
 Page: 2 of 3  
 No. of Coolers: 2  
 Cooler Temps: \_\_\_\_\_

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID  | Date  | Time | Matrix | No. Containers | Analysis Requested                                  |  |  |   |   |  |                                      |                            | Notes/Comments                                     |  |  |  |
|--|---|------|--------|----------------|---|--|--|---|---|--|--------------------------------------|----------------------------|--|--|--|--|
|  |   |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A         | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |  |  |  |  |
| GW-103-1-10117-3.5-8.5-(20)  | 10/11/17  | 1530 | Water  | 5              | X   | X  | X  | X   | X   | X  | X                                    | X                          | Dissolved samples<br>are field filtered<br>0.45 um |  |  |  |
| GW-2D1-1-101217-7.5-12.5   | 10/12/17  | 0900 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| GW-2D1-1-101217-7.5-12.5-(20)  |   | 0900 |        | 5              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| GW-2D3-2-101217-26.5-31.5  |   | 0845 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| GW-2D3-2-101217-26.5-31.5-(20)   |   | 0845 |        | 5              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| GW-1D1-1-101217-9.6-14.6   |   | 1045 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| GW-1D1-1-101217-9.6-14.6-(20)  |   | 1045 |        | 5              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| 1W-3C5-2-101217-17.5-22.5  |   | 1130 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| 1W-3C5-2-101217-17.5-22.5-(20)   |   | 1130 |        | 5              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| 1W-3C2-1-101217-7.5-12   |   | 1115 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| 1W-3C2-1-101217-7.5-12-(20)  |   | 1115 |        | 5              | X   | X  | X  | X   | X   | X  | X                                    | X                          |  |  |  |  |
| Comments/Special Instructions  | Relinquished by: [Signature] Date & Time: 10/12/17 1740 |      |        |                | Received by: [Signature] Date & Time: 10/12/17 1740 |  |  |   | Relinquished by: [Signature] Date & Time: _____   |  |                                      |                            | Received by: [Signature] Date & Time: _____        |  |  |  |
| submit EDD to PIONEER using PIONEER EDD format fill to Port of Tacoma #0#79227 | Printed Name: Luke Kern Company: SBC                    |      |        |                | Printed Name: Stephanie Flynn Company: ARI          |  |  |   | Printed Name: _____ Company: _____  |  |                                      |                            | Printed Name: _____ Company: _____                 |  |  |  |

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Date: 10/12/17  
 Page: 3 of 3  
 No. of Coolers: 3  
 Cooler Temps: \_\_\_\_\_

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID   | Date  | Time | Matrix | No. Containers | Analysis Requested   |   |   |  |   |   |                                      |                            | Notes/Comments                       |
|---|---|------|--------|----------------|--|---|---|--|---|---|--------------------------------------|----------------------------|--------------------------------------|
|   |   |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A  | Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite<br>EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |                                      |
| GW-301-1-101217-3-8   | 10/12/17  | 1315 | Water  | 4              | X  | X   | X   | X  | X   | X   | X                                    | X                          | Dissolved Samples are field filtered |
| GW-301-1-101217-3-8-(20)  |   | 1315 |        | 5              | X  | X   | X   | X  | X   | X   | X                                    | X                          |                                      |
| GW-301-1-101217-4.5-12.5  |   | 1400 |        | 4              | X  | X   | X   | X  | X   | X   | X                                    | X                          |                                      |
| GW-301-1-101217-4.5-12.5-(20)   |   | 1400 |        | 5              | X  | X   | X   | X  | X   | X   | X                                    | X                          |                                      |
| GW-4D2-1-101217-4.3-9.3   |   | 1530 |        | 4              | X  | X   | X   | X  | X   | X   | X                                    | X                          |                                      |
| GW-4D2-1-101217-4.3-9.3-(20)  |   | 1530 |        | 5              | X  | X   | X   | X  | X   | X   | X                                    | X                          |                                      |
| GW-3E1-1-101217-5-10  |   | 1600 |        | 4              | X  | X   | X   | X  | X   | X   | X                                    | X                          |                                      |
| GW-3E1-1-101217-5-10-(20)   |   | 1600 |        | 5              | X  | X   | X   | X  | X   | X   | X                                    | X                          |                                      |
| Comments/Special Instructions   | Relinquished by: <u>[Signature]</u><br>Printed Name: <u>Sam [unclear]</u><br>Company: <u>ARI</u><br>Date & Time: <u>10/12/17 1740</u> |      |        |                | Received by: <u>[Signature]</u><br>Printed Name: <u>Stephanie Fisher</u><br>Company: <u>ARI</u><br>Date & Time: <u>10/12/17 1740</u> |   |   |  | Relinquished by: _____<br>Printed Name: _____<br>Company: _____<br>Date & Time: _____           |   |                                      |                            |                                      |
| Submit EDD to PIONEER using PIONEER EDD format ill to Port of Tacoma 'O#79227 | Relinquished by: _____<br>Printed Name: _____<br>Company: _____<br>Date & Time: _____   |      |        |                | Received by: _____<br>Printed Name: _____<br>Company: _____<br>Date & Time: _____  |   |   |  | Relinquished by: _____<br>Printed Name: _____<br>Company: _____<br>Date & Time: _____           |   |                                      |                            |                                      |

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by a client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Cooler Receipt Form

ARI Client: Pioneer

Project Name: Arkema FS DG Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier  Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 1750197

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.8 3.2 1.2

Time: 1740

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: SF Date: 10/12/17 Time: 1740

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: NS, UE

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO

Were all VOC vials free of air bubbles? ..... NA  YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI ..... NA 10/6/17

Was Sample Split by ARI :  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: B-H Date: 10/13/17 Time: 6:53

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**  
 Vials w/ peabubbles: GW-307-2R(x3), GW-202-2(x3), GW-201-1R(x1),  
 GW-201-1(x2), GW-203-2(x1), GW-302-1(x3). Vials w/ hs: GW-301-1(x3),  
 GW-305-2(x3), GW-103-1(x2), GW-306-1R(x1).

By: B-H Date: 10/13/17

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |





WORK ORDER

17J0197

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: 79227

Preservation Confirmation

| Container ID | Container Type                    | pH      |
|--------------|-----------------------------------|---------|
| 17J0197-01 A | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0197-01 B | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0197-01 C | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0197-01 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-02 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-02 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-02 C | Small OJ, 500 mL                  |         |
| 17J0197-02 D | Small OJ, 500 mL                  |         |
| 17J0197-02 E | Large OJ, 1000 mL                 |         |
| 17J0197-03 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-03 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-03 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-03 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-04 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-04 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-04 C | Small OJ, 500 mL                  |         |
| 17J0197-04 D | Small OJ, 500 mL                  |         |
| 17J0197-04 E | Large OJ, 1000 mL                 |         |
| 17J0197-05 A | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0197-05 B | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0197-05 C | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0197-05 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-06 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-06 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-06 C | Small OJ, 500 mL                  |         |
| 17J0197-06 D | Small OJ, 500 mL                  |         |
| 17J0197-06 E | Large OJ, 1000 mL                 |         |
| 17J0197-07 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-07 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-07 C | Small OJ, 500 mL                  |         |
| 17J0197-07 D | Small OJ, 500 mL                  |         |

Reviewed By B.H.

Date 10/13/17



WORK ORDER

17J0197

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

|              |                                   |         |
|--------------|-----------------------------------|---------|
| 17J0197-07 E | Large OJ, 1000 mL                 |         |
| 17J0197-08 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-08 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-08 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-08 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-09 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-09 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-09 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-09 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-10 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-10 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-10 C | Small OJ, 500 mL                  |         |
| 17J0197-10 D | Small OJ, 500 mL                  |         |
| 17J0197-10 E | Large OJ, 1000 mL                 |         |
| 17J0197-11 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-11 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-11 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-11 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-12 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-12 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-12 C | Small OJ, 500 mL                  |         |
| 17J0197-12 D | Small OJ, 500 mL                  |         |
| 17J0197-12 E | Large OJ, 1000 mL                 |         |
| 17J0197-13 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-13 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-13 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-13 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-14 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-14 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-14 C | Small OJ, 500 mL                  |         |
| 17J0197-14 D | Small OJ, 500 mL                  |         |
| 17J0197-14 E | Large OJ, 1000 mL                 |         |
| 17J0197-15 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-15 B | VOA Vial, Amber, 40 mL, HCL       |         |

BH

10/13/17





WORK ORDER

17J0197

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

|              |                                   |         |
|--------------|-----------------------------------|---------|
| 17J0197-15 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-15 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-16 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-16 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-16 C | Small OJ, 500 mL                  |         |
| 17J0197-16 D | Small OJ, 500 mL                  |         |
| 17J0197-16 E | Large OJ, 1000 mL                 |         |
| 17J0197-17 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-17 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-17 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-17 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-18 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-18 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-18 C | Small OJ, 500 mL                  |         |
| 17J0197-18 D | Small OJ, 500 mL                  |         |
| 17J0197-18 E | Large OJ, 1000 mL                 |         |
| 17J0197-19 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-19 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-19 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-19 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-20 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-20 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-20 C | Small OJ, 500 mL                  |         |
| 17J0197-20 D | Small OJ, 500 mL                  |         |
| 17J0197-20 E | Large OJ, 1000 mL                 |         |
| 17J0197-21 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-21 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-21 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-21 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-22 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-22 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-22 C | Small OJ, 500 mL                  |         |
| 17J0197-22 D | Small OJ, 500 mL                  |         |
| 17J0197-22 E | Large OJ, 1000 mL                 |         |

B.H.

10/13/17



WORK ORDER

17J0197

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

|              |                                   |         |
|--------------|-----------------------------------|---------|
| 17J0197-23 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-23 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-23 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-23 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-24 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-24 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-24 C | Small OJ, 500 mL                  |         |
| 17J0197-24 D | Small OJ, 500 mL                  |         |
| 17J0197-24 E | Large OJ, 1000 mL                 |         |
| 17J0197-25 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-25 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-25 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-25 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-26 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-26 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-26 C | Small OJ, 500 mL                  |         |
| 17J0197-26 D | Small OJ, 500 mL                  |         |
| 17J0197-26 E | Large OJ, 1000 mL                 |         |
| 17J0197-27 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-27 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-27 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-27 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-28 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-28 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-28 C | Small OJ, 500 mL                  |         |
| 17J0197-28 D | Small OJ, 500 mL                  |         |
| 17J0197-28 E | Large OJ, 1000 mL                 |         |
| 17J0197-29 A | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-29 B | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-29 C | VOA Vial, Amber, 40 mL, HCL       |         |
| 17J0197-29 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |
| 17J0197-30 A | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 Pass |
| 17J0197-30 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0197-30 C | Small OJ, 500 mL                  |         |

B.H

10/13/17





WORK ORDER

17J0197

|  |                                    |
|--|------------------------------------|
| Client: Pioneer Technologies Corporation                 | Project Manager: Amanda Volgardsen |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio | Project Number: 79227              |

|              |                             |
|--------------|-----------------------------|
| 17J0197-30 D | Small OJ, 500 mL            |
| 17J0197-30 E | Large OJ, 1000 mL           |
| 17J0197-31 A | VOA Vial, Clear, 40 mL, HCL |
| 17J0197-31 B | VOA Vial, Clear, 40 mL, HCL |

B H.  
Preservation Confirmed By

10/13/17  
Date

B H.  
Reviewed By

10/13/17  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                       | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|---------------------------------|---------------|--------|-------------------|-------------------|
| GW-3C6-1R-101117-4.5-9.5        | 17J0197-01    | Water  | 11-Oct-2017 09:45 | 12-Oct-2017 17:40 |
| GW-3C6-1R-101117-4.5-9.5-(20)   | 17J0197-02    | Water  | 11-Oct-2017 09:45 | 12-Oct-2017 17:40 |
| GW-3C7-2R-101117-24.3-29.3      | 17J0197-03    | Water  | 11-Oct-2017 10:30 | 12-Oct-2017 17:40 |
| GW-3C7-2R-101117-24.3-29.3-(20) | 17J0197-04    | Water  | 11-Oct-2017 10:30 | 12-Oct-2017 17:40 |
| GW-2C2-2-101117-20.6-25.6       | 17J0197-05    | Water  | 11-Oct-2017 13:30 | 12-Oct-2017 17:40 |
| GW-2C2-2-101117-20.6-25.6-(20)  | 17J0197-06    | Water  | 11-Oct-2017 13:30 | 12-Oct-2017 17:40 |
| GW-2C1-1R-101117-5.1-10.1-(20)  | 17J0197-07    | Water  | 11-Oct-2017 13:45 | 12-Oct-2017 17:40 |
| GW-2C1-1R-101117-5.1-10.1       | 17J0197-08    | Water  | 11-Oct-2017 13:45 | 12-Oct-2017 17:40 |
| GW-1C2-2-101117-13.8-23.6       | 17J0197-09    | Water  | 11-Oct-2017 15:00 | 12-Oct-2017 17:40 |
| GW-1C2-2-101117-13.8-23.6-(20)  | 17J0197-10    | Water  | 11-Oct-2017 15:00 | 12-Oct-2017 17:40 |
| GW-1C3-1-101117-3.5-8.5         | 17J0197-11    | Water  | 11-Oct-2017 15:30 | 12-Oct-2017 17:40 |
| GW-1C3-1-101117-3.5-8.5-(20)    | 17J0197-12    | Water  | 11-Oct-2017 15:30 | 12-Oct-2017 17:40 |
| GW-2D1-1-101217-7.5-12.5        | 17J0197-13    | Water  | 12-Oct-2017 09:00 | 12-Oct-2017 17:40 |
| GW-2D1-1-101217-7.5-12.5-(20)   | 17J0197-14    | Water  | 12-Oct-2017 09:00 | 12-Oct-2017 17:40 |
| GW-2D3-2-101217-26.5-31.5       | 17J0197-15    | Water  | 12-Oct-2017 08:45 | 12-Oct-2017 17:40 |
| GW-2D3-2-101217-26.5-31.5-(20)  | 17J0197-16    | Water  | 12-Oct-2017 08:45 | 12-Oct-2017 17:40 |
| GW-1D1-1-101217-9.6-14.6        | 17J0197-17    | Water  | 12-Oct-2017 10:45 | 12-Oct-2017 17:40 |
| GW-1D1-1-101217-9.6-14.6-(20)   | 17J0197-18    | Water  | 12-Oct-2017 10:45 | 12-Oct-2017 17:40 |
| GW-3C5-2-101217-17.5-22.5       | 17J0197-19    | Water  | 12-Oct-2017 11:30 | 12-Oct-2017 17:40 |
| GW-3C5-2-101217-17.5-22.5-(20)  | 17J0197-20    | Water  | 12-Oct-2017 11:30 | 12-Oct-2017 17:40 |
| GW-3C2-1-101217-7.5-12          | 17J0197-21    | Water  | 12-Oct-2017 11:15 | 12-Oct-2017 17:40 |
| GW-3C2-1-101217-7.5-12-(20)     | 17J0197-22    | Water  | 12-Oct-2017 11:15 | 12-Oct-2017 17:40 |
| GW-3C1-1-101217-3-8             | 17J0197-23    | Water  | 12-Oct-2017 13:15 | 12-Oct-2017 17:40 |
| GW-3C1-1-101217-3-8-(20)        | 17J0197-24    | Water  | 12-Oct-2017 13:15 | 12-Oct-2017 17:40 |
| GW-3D1-1-101217-4.5-12.5        | 17J0197-25    | Water  | 12-Oct-2017 14:00 | 12-Oct-2017 17:40 |
| GW-3D1-1-101217-4.5-12.5-(20)   | 17J0197-26    | Water  | 12-Oct-2017 14:00 | 12-Oct-2017 17:40 |
| GW-4D2-1-101217-4.3-9.3         | 17J0197-27    | Water  | 12-Oct-2017 15:30 | 12-Oct-2017 17:40 |
| GW-4D2-1-101217-4.3-9.3-(20)    | 17J0197-28    | Water  | 12-Oct-2017 15:30 | 12-Oct-2017 17:40 |
| GW-3E1-1-101217-5-10            | 17J0197-29    | Water  | 12-Oct-2017 16:00 | 12-Oct-2017 17:40 |
| GW-3E1-1-101217-5-10-(20)       | 17J0197-30    | Water  | 12-Oct-2017 16:00 | 12-Oct-2017 17:40 |
| Trip Blanks                     | 17J0197-31    | Water  | 11-Oct-2017 00:00 | 12-Oct-2017 17:40 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 12, 2017 under ARI workorder 17J0197. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Sample GW-3C2-1-101217-7.5-12 was reanalyzed twice at higher reporting limits due to sample concentrations exceeding the upper range of the calibrations, these analytes have been flagged with "E" qualifiers. The final reanalysis was free of "E" flags. All re-analyses were reported. No further corrective action was taken.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Anions - EPA Method 300.0

Select samples were re-analyzed outside of the recommended holding times due to the high concentration of Chloride. These samples have been flagged with an "H" qualifier.

The samples were started at a 100x dilution due to the historically high Chloride. Also due to the high Chloride as well as matrix interference some of the peaks for Nitrates may appear as non-detects.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-3C6-1R-101117-4.5-9.5-(20). The duplicate RPD were within QC limits. The matrix spike has no spike recovery for Nitrate and Bromide. This is likely due to matrix interference. The results are advisory. No corrective action was taken.

### Dissolved Organic Carbon - Method SM5310

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.





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5205 Corporate Ctr. Ct. SE, Ste A  
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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-3C6-1R-101117-4.5-9.5-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-3C6-1R-101117-4.5-9.5-(20). The duplicate RPD was within QC limits.

#### **Alkalinity - Method SM2320**

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-3C6-1R-101117-4.5-9.5-(20). The duplicate RPD was within QC limits.

#### **Total and Dissolved Metals - EPA Method 200.8**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A total matrix spike and duplicate were prepared in conjunction with sample GW-3D1-1-101217-4.5-12.5. The matrix spike percent recoveries were within QC limits. The duplicate has a high RPD for Lead. The results are advisory. No corrective action was taken.

A dissolved matrix spike and duplicate were prepared in conjunction with sample GW-3D1-1-101217-4.5-12.5-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **Dissolved Metals - EPA Method 6010C**



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Iron and Sodium detected below the reporting limits, but above the method detection limits. These metals have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

**Total and Dissolved Hg - EPA Method 7470/7471**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A total matrix spike and duplicate were prepared in conjunction with sample GW-3D1-1-101217-4.5-12.5. The matrix spike percent recovery and duplicate RPD were within QC limits.

A dissolved matrix spike and duplicate were prepared in conjunction with sample GW-3D1-1-101217-4.5-12.5-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5**  
**17J0197-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/11/2017 09:45  
Analyzed: 13-Oct-2017 16:42

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0354 Sample Size: 2 mL  
Prepared: 13-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 98.3 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.0 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 94.7 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 97.4 % |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5**  
**17J0197-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 09:45  
Analyzed: 23-Oct-2017 20:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>20.9</b> | ug/L  | D     |



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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5**  
**17J0197-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 09:45  
Analyzed: 23-Oct-2017 20:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>32.1</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>105</b>  | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>16.4</b> | ug/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5**  
**17J0197-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 09:45  
Analyzed: 27-Oct-2017 13:27

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | <b>0.000240</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/11/2017 09:45  
Analyzed: 23-Oct-2017 14:55

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | 4.74   | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | 3.72   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | 20.8   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | 2.07   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | 0.187  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | 7.84   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | 29.7   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | 2700   | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 09:45  
Analyzed: 23-Oct-2017 18:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>10.9</b> | ug/L  | D     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 09:45  
Analyzed: 23-Oct-2017 18:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>14.2</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>25.7</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>6.66</b> | ug/L  | J, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 09:45  
Analyzed: 24-Oct-2017 15:13

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/11/2017 09:45  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>6340</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 09:45  
Analyzed: 13-Oct-2017 09:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 100      | 10.0            | ND     | mg-N/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/11/2017 09:45  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 563    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 563    | mg/L CaCO3 |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/11/2017 09:45  
Analyzed: 20-Oct-2017 08:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>236</b> | mg/L  |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 09:45  
Analyzed: 13-Oct-2017 13:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | <b>8.02</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 20       | 2.00            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | <b>20.4</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>4.17</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C6-1R-101117-4.5-9.5-(20)**  
**17J0197-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 09:45  
Analyzed: 18-Oct-2017 19:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>3560</b> | mg/L  | D     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3**  
**17J0197-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/11/2017 10:30  
Analyzed: 13-Oct-2017 17:08

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0354 Sample Size: 10 mL  
Prepared: 13-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 116   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.0  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 109   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3**  
**17J0197-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 10:30  
Analyzed: 23-Oct-2017 20:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3**  
**17J0197-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 10:30  
Analyzed: 23-Oct-2017 20:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3.38</b> | ug/L  | J, D  |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3**  
**17J0197-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 10:30  
Analyzed: 27-Oct-2017 13:28

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/11/2017 10:30  
Analyzed: 23-Oct-2017 16:07

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 10       | 0.0850          | 0.500           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 10       | 0.0510          | 0.500           | 623    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 10       | 0.0130          | 0.500           | 15.5   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 10       | 0.160           | 0.500           | 927    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 10       | 0.0034          | 0.0100          | 2.93   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 10       | 0.520           | 5.00            | 491    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 10       | 0.0520          | 0.600           | 15.9   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 10       | 19.0            | 500             | 29000  | mg/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 10:30  
Analyzed: 23-Oct-2017 18:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 10:30  
Analyzed: 23-Oct-2017 18:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3.84</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 10:30  
Analyzed: 24-Oct-2017 15:14

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/11/2017 10:30  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>69200</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 10:30  
Analyzed: 13-Oct-2017 10:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | <b>20.6</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>168</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/11/2017 10:30  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453 Sample Size: 50 mL  
Prepared: 17-Oct-2017 Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1490   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1490   | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/11/2017 10:30  
Analyzed: 20-Oct-2017 10:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>20.0</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 10:30  
Analyzed: 13-Oct-2017 14:39

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | H, U  |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C7-2R-101117-24.3-29.3-(20)**  
**17J0197-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 10:30  
Analyzed: 18-Oct-2017 19:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 25000    | 2500            | <b>48900</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6**  
**17J0197-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/11/2017 13:30  
Analyzed: 13-Oct-2017 17:34

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0354 Sample Size: 10 mL  
Prepared: 13-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 106   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.4  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |



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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6**  
**17J0197-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 13:30  
Analyzed: 23-Oct-2017 20:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>1.76</b> | ug/L  | J, D  |





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**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6**  
**17J0197-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 13:30  
Analyzed: 23-Oct-2017 20:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>9.22</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>12.8</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>3.68</b> | ug/L  | J, D  |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6**  
**17J0197-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 13:30  
Analyzed: 27-Oct-2017 13:30

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/11/2017 13:30  
Analyzed: 23-Oct-2017 15:40

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>383</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>112</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>247</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>2.93</b>  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>238</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>6.85</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>16900</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 13:30  
Analyzed: 23-Oct-2017 19:01

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 13:30  
Analyzed: 23-Oct-2017 19:01

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>8.70</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>1.36</b> | ug/L  | J, D  |



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**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 13:30  
Analyzed: 24-Oct-2017 15:16

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/11/2017 13:30  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>40600</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 13:30  
Analyzed: 13-Oct-2017 10:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | 311    | mg/L  | D     |





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Reported:  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/11/2017 13:30

Instrument: Accumet AR60

Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 518    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 518    | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/11/2017 13:30  
Analyzed: 20-Oct-2017 10:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>20.3</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 13:30  
Analyzed: 13-Oct-2017 12:41

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2C2-2-101117-20.6-25.6-(20)**  
**17J0197-06RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 13:30  
Analyzed: 18-Oct-2017 20:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 25000    | 2500            | <b>28600</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/11/2017 13:45  
Analyzed: 23-Oct-2017 15:04

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>1.85</b>  | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>6.57</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>9.40</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>2.73</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.226</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>5.31</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>24.3</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>787</b>   | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 13:45  
Analyzed: 23-Oct-2017 17:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | <b>36.2</b> | ug/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 13:45  
Analyzed: 23-Oct-2017 17:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>288</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>14.9</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>3.48</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 13:45  
Analyzed: 24-Oct-2017 15:18

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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**Reported:**  
30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/11/2017 13:45  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 50 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>2110</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/11/2017 13:45  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 859    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 859    | mg/L CaCO3 |       |



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30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/11/2017 13:45  
Analyzed: 20-Oct-2017 10:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>151</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 13:45  
Analyzed: 13-Oct-2017 12:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | 4.22   | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | 9.57   | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | 7.59   | mg/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1-(20)**  
**17J0197-07RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 13:45  
Analyzed: 18-Oct-2017 21:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>582</b> | mg/L  | D     |



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30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1**  
**17J0197-08 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/11/2017 13:45  
Analyzed: 13-Oct-2017 17:59

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0354 Sample Size: 10 mL  
Prepared: 13-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 94.9 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.9 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 93.5 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.1 % |       |



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30-Oct-2017 13:32

**GW-2C1-1R-101117-5.1-10.1**  
**17J0197-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 13:45  
Analyzed: 23-Oct-2017 19:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>68.7</b> | ug/L  | D     |



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**GW-2C1-1R-101117-5.1-10.1**  
**17J0197-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 13:45  
Analyzed: 23-Oct-2017 19:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>287</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>21.2</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>5.73</b> | ug/L  | D     |





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**GW-2C1-1R-101117-5.1-10.1**  
**17J0197-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 13:45  
Analyzed: 27-Oct-2017 13:31

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6**  
**17J0197-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/11/2017 15:00  
Analyzed: 13-Oct-2017 18:25

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0354 Sample Size: 10 mL  
Prepared: 13-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|--|------------|----------|-----------------|-----------------|-------------|----------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L     | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L     | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L     | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L     | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 | <i>80-129 %</i> | <i>102</i>  | <i>%</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 | <i>80-120 %</i> | <i>98.7</i> | <i>%</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 | <i>80-120 %</i> | <i>95.8</i> | <i>%</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 | <i>80-120 %</i> | <i>98.9</i> | <i>%</i> |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6**  
**17J0197-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 15:00  
Analyzed: 23-Oct-2017 20:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6**  
**17J0197-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 15:00  
Analyzed: 23-Oct-2017 20:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>5.02</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>2.22</b> | ug/L  | J, D  |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6**  
**17J0197-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 15:00  
Analyzed: 27-Oct-2017 13:33

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Olympia WA, 98503

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Reported:  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/11/2017 15:00  
Analyzed: 23-Oct-2017 14:51

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0290</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>137</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>76.8</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>246</b>    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.618</b>  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>165</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>21.3</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>5500</b>   | mg/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 15:00  
Analyzed: 23-Oct-2017 19:06

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 15:00  
Analyzed: 23-Oct-2017 19:06

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>5.24</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>2.10</b> | ug/L  | J, D  |





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Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 15:00  
Analyzed: 24-Oct-2017 15:19

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/11/2017 15:00  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>12800</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 15:00  
Analyzed: 13-Oct-2017 11:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 100      | 10.0            | ND     | mg-N/L | U     |



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Reported:  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/11/2017 15:00  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1470   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1470   | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/11/2017 15:00  
Analyzed: 20-Oct-2017 11:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>88.5</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 15:00  
Analyzed: 13-Oct-2017 13:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | 5.22   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | 5.87   | mg/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C2-2-101117-13.8-23.6-(20)**  
**17J0197-10RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 15:00  
Analyzed: 18-Oct-2017 21:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>8240</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5**  
**17J0197-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/11/2017 15:30  
Analyzed: 13-Oct-2017 18:51

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0354 Sample Size: 10 mL  
Prepared: 13-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 96.6 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.9 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.5 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 98.7 % |       |





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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5**  
**17J0197-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 15:30  
Analyzed: 23-Oct-2017 19:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5**  
**17J0197-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 15:30  
Analyzed: 23-Oct-2017 19:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>741</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>1.53</b> | ug/L  | J, D  |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5**  
**17J0197-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 15:30  
Analyzed: 27-Oct-2017 13:35

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/11/2017 15:30  
Analyzed: 23-Oct-2017 15:00

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0297</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>31.3</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>20.7</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>36.2</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.744</b>  | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>11.5</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>22.8</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>563</b>    | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/11/2017 15:30  
Analyzed: 23-Oct-2017 17:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/11/2017 15:30  
Analyzed: 23-Oct-2017 17:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>751</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>1.38</b> | ug/L  | J, D  |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/11/2017 15:30  
Analyzed: 24-Oct-2017 15:25

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/11/2017 15:30  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 50 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1520</b> | mg/L  |       |





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**Reported:**  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 15:30  
Analyzed: 13-Oct-2017 11:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 100      | 10.0            | 247    | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/11/2017 15:30  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 996    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 996    | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/11/2017 15:30  
Analyzed: 20-Oct-2017 11:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>38.2</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-1C3-1-101117-3.5-8.5-(20)**  
**17J0197-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/11/2017 15:30  
Analyzed: 13-Oct-2017 13:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | 3.93   | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | 1.49   | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | 6.95   | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5**  
**17J0197-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/12/2017 09:00  
Analyzed: 13-Oct-2017 19:16

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0354 Sample Size: 10 mL  
Prepared: 13-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 97.5 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.0 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103 %  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5**  
**17J0197-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 09:00  
Analyzed: 23-Oct-2017 19:57

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>8.15</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5**  
**17J0197-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 09:00  
Analyzed: 23-Oct-2017 19:57

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>2.57</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>1.79</b>  | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.975</b> | ug/L  | J, D  |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5**  
**17J0197-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 09:00  
Analyzed: 27-Oct-2017 13:40

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |





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Reported:  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 09:00  
Analyzed: 23-Oct-2017 16:00

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.322</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>5.41</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>7.23</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.894</b> | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.309</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>13.5</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>22.2</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>1080</b>  | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 09:00  
Analyzed: 23-Oct-2017 18:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | <b>0.985</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 09:00  
Analyzed: 23-Oct-2017 18:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>3.61</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>1.86</b> | ug/L  | J, D  |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>1.20</b> | ug/L  | J, D  |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 09:00  
Analyzed: 24-Oct-2017 15:26

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 09:00  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 20 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>2360</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/12/2017 09:00

Instrument: Accumet AR60

Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 599    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 599    | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 09:00  
Analyzed: 20-Oct-2017 12:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>35.8</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 09:00  
Analyzed: 13-Oct-2017 14:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | <b>5.64</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 20       | 2.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 20       | 2.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | <b>8.85</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>5.36</b> | mg/L  | D     |





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**Reported:**  
30-Oct-2017 13:32

**GW-2D1-1-101217-7.5-12.5-(20)**  
**17J0197-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 09:00  
Analyzed: 18-Oct-2017 21:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1090</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5**  
**17J0197-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/12/2017 08:45  
Analyzed: 13-Oct-2017 19:42

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0354 Sample Size: 10 mL  
Prepared: 13-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 110   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.3  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 98.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 106   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5**  
**17J0197-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 08:45  
Analyzed: 23-Oct-2017 21:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5**  
**17J0197-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 08:45  
Analyzed: 23-Oct-2017 21:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2.32</b> | ug/L  | J, D  |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>1.24</b> | ug/L  | J, D  |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5**  
**17J0197-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 08:45  
Analyzed: 27-Oct-2017 13:42

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Olympia WA, 98503

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Reported:  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 08:45  
Analyzed: 23-Oct-2017 16:12

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | 449    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | 122    | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | 619    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | 2.65   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | 430    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | 20.7   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | 20200  | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 08:45  
Analyzed: 23-Oct-2017 19:11

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 08:45  
Analyzed: 23-Oct-2017 19:11

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2.46</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |





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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 08:45  
Analyzed: 24-Oct-2017 15:28

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 08:45  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>48800</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 08:45  
Analyzed: 13-Oct-2017 11:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/12/2017 08:45  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1660   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1660   | mg/L CaCO3 |       |



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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 08:45  
Analyzed: 20-Oct-2017 12:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>54.6</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 08:45  
Analyzed: 13-Oct-2017 15:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>1710</b> | mg/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-2D3-2-101217-26.5-31.5-(20)**  
**17J0197-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 08:45  
Analyzed: 18-Oct-2017 21:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 25000    | 2500            | <b>31900</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6**  
**17J0197-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/12/2017 10:45  
Analyzed: 16-Oct-2017 13:10

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0400 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.10</b>     | ug/L          | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND              | ug/L          | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.98</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>96.7 %</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>99.6 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>95.8 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>97.1 %</i> |       |





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**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6**  
**17J0197-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 10:45  
Analyzed: 23-Oct-2017 20:02

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>4.49</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6**  
**17J0197-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 10:45  
Analyzed: 23-Oct-2017 20:02

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>26.4</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>17.5</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>24.8</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6**  
**17J0197-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 10:45  
Analyzed: 27-Oct-2017 13:44

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Reported:  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 10:45  
Analyzed: 23-Oct-2017 15:50

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0487</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>2.08</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.567</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.170</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0056</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>5.17</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>40.6</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>1150</b>   | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 10:45  
Analyzed: 23-Oct-2017 18:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | <b>3.58</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 10:45  
Analyzed: 23-Oct-2017 18:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>24.0</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>14.8</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>22.2</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 10:45  
Analyzed: 24-Oct-2017 15:29

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 10:45  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 20 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>2570</b> | mg/L  |       |





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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/12/2017 10:45  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>700</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>262</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>962</b> | mg/L CaCO3 |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 10:45  
Analyzed: 20-Oct-2017 12:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>51.2</b> | mg/L  |       |



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Olympia WA, 98503

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Project Number: 79227  
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Reported:  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 10:45  
Analyzed: 14-Oct-2017 11:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | 2.61   | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | 7.17   | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | 7.67   | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
30-Oct-2017 13:32

**GW-1D1-1-101217-9.6-14.6-(20)**  
**17J0197-18RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 10:45  
Analyzed: 18-Oct-2017 22:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>1010</b> | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5**  
**17J0197-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/12/2017 11:30  
Analyzed: 16-Oct-2017 13:36

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0400 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.90</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>6.40</b> | ug/L   |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.14</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.60</b> | ug/L   |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 123 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 95.7 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106 %  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5**  
**17J0197-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 11:30  
Analyzed: 23-Oct-2017 22:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 50       | 3.40            | 5.00            | 13.5   | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5**  
**17J0197-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 11:30  
Analyzed: 23-Oct-2017 22:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 50       | 1.10            | 10.0            | <b>23.8</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 50       | 17.0            | 25.0            | <b>54.6</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 50       | 2.50            | 25.0            | <b>41.0</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5**  
**17J0197-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 11:30  
Analyzed: 27-Oct-2017 13:45

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |





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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 11:30  
Analyzed: 23-Oct-2017 15:25

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 20       | 0.170           | 1.00            | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 20       | 0.102           | 1.00            | <b>655</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 20       | 0.0260          | 1.00            | <b>194</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 20       | 0.320           | 1.00            | <b>830</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 20       | 0.0068          | 0.0200          | <b>6.55</b>  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 20       | 1.04            | 10.0            | <b>638</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 20       | 0.104           | 1.20            | <b>13.7</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 20       | 38.0            | 1000            | <b>71000</b> | mg/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 11:30  
Analyzed: 23-Oct-2017 22:09

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 50       | 3.40            | 5.00            | ND     | ug/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 11:30  
Analyzed: 23-Oct-2017 22:09

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>7.30</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 50       | 17.0            | 25.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 50       | 2.50            | 25.0            | ND          | ug/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 11:30  
Analyzed: 24-Oct-2017 15:31

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 11:30  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>138000</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 11:30  
Analyzed: 13-Oct-2017 16:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | <b>26.0</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | U     |



Pioneer Technologies Corporation  
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Reported:  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/12/2017 11:30  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 829    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 829    | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 11:30  
Analyzed: 20-Oct-2017 13:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>25.8</b> | mg/L  |       |





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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 11:30  
Analyzed: 14-Oct-2017 11:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 500      | 50.0            | ND     | mg-N/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>1050</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
30-Oct-2017 13:32

**GW-3C5-2-101217-17.5-22.5-(20)**  
**17J0197-20RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 11:30  
Analyzed: 18-Oct-2017 22:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|---------------|-------|-------|
| Chloride | 16887-00-6 | 62500    | 6250            | <b>111000</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12**  
**17J0197-21 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/12/2017 11:15  
Analyzed: 16-Oct-2017 14:01

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0400 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>623</b>  | ug/L   | E     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>820</b>  | ug/L   | E     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>421</b>  | ug/L   | E     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>2320</b> | ug/L   | E     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 94.4 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 94.4 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 94.8 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101 %  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12**  
**17J0197-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 11:15  
Analyzed: 23-Oct-2017 21:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>2.54</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12**  
**17J0197-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 11:15  
Analyzed: 23-Oct-2017 21:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>43.9</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>15.3</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12**  
**17J0197-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 11:15  
Analyzed: 27-Oct-2017 13:47

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12**  
**17J0197-21RE1 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/12/2017 11:15  
Analyzed: 17-Oct-2017 12:07

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0448 Sample Size: 0.05 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units  | Notes |
|--|------------|----------|-----------------|-----------------|--------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 11.4            | 40.0            | <b>789</b>   | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 5.46            | 40.0            | <b>3630</b>  | ug/L   |       |
| Trichloroethene                          | 79-01-6    | 1        | 9.78            | 40.0            | <b>588</b>   | ug/L   |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 9.48            | 40.0            | <b>16400</b> | ug/L   | E     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %     | 102 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %     | 94.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %     | 95.4 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %     | 103 %  |       |



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Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12**  
**17J0197-21RE2 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/12/2017 11:15  
Analyzed: 17-Oct-2017 15:32

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0448 Sample Size: 0.02 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 28.6            | 100             | <b>714</b>      | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 13.7            | 100             | <b>3470</b>     | ug/L          |       |
| Trichloroethene                          | 79-01-6    | 1        | 24.5            | 100             | <b>495</b>      | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 23.7            | 100             | <b>16400</b>    | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>107 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>96.3 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>91.3 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>103 %</i>  |       |





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Reported:  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 11:15  
Analyzed: 23-Oct-2017 15:55

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0289</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>8.32</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.134</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.639</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0025</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>20.4</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>23.5</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>2550</b>   | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 11:15  
Analyzed: 23-Oct-2017 19:16

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>2.06</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 11:15  
Analyzed: 23-Oct-2017 19:16

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>42.6</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>12.4</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 11:15  
Analyzed: 24-Oct-2017 15:33

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 11:15  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>5320</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 11:15  
Analyzed: 13-Oct-2017 17:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 100      | 10.0            | ND     | mg-N/L | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/12/2017 11:15  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>542</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>552</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1090</b> | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 11:15  
Analyzed: 20-Oct-2017 14:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>98.2</b> | mg/L  |       |





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Reported:  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 11:15  
Analyzed: 14-Oct-2017 11:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | <b>2.39</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 20       | 2.00            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | <b>6.03</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>48.6</b> | mg/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C2-1-101217-7.5-12-(20)**  
**17J0197-22RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 11:15  
Analyzed: 18-Oct-2017 22:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>3110</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8**  
**17J0197-23 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/12/2017 13:15  
Analyzed: 17-Oct-2017 12:27

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0448 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>2.27</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.51</b>     | ug/L          |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.22</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.29</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>104 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>96.8 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>96.3 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>101 %</i>  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8**  
**17J0197-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 13:15  
Analyzed: 23-Oct-2017 21:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>20.6</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8**  
**17J0197-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 13:15  
Analyzed: 23-Oct-2017 21:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>178</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>90.4</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>69.9</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8**  
**17J0197-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 13:15  
Analyzed: 27-Oct-2017 13:48

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483  
Prepared: 18-Oct-2017

Sample Size: 10 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | <b>0.000520</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8**  
**17J0197-23RE1 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/12/2017 13:15  
Analyzed: 18-Oct-2017 10:50

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0492 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>1.90</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.44</b> | ug/L   |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.15</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.14</b> | ug/L   | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 105 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.5 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.1 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 97.2 % |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 13:15  
Analyzed: 23-Oct-2017 15:09

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>2.11</b>  | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>13.3</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>13.6</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>2.12</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.957</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>13.9</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>42.4</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>2310</b>  | mg/L  |       |





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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 13:15  
Analyzed: 23-Oct-2017 19:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>6.72</b> | ug/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 13:15  
Analyzed: 23-Oct-2017 19:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>70.1</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>28.6</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>37.5</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 13:15  
Analyzed: 24-Oct-2017 15:34

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000150</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 13:15  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>5420</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 13:15  
Analyzed: 13-Oct-2017 17:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 100      | 10.0            | ND     | mg-N/L | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/12/2017 13:15  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 797    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 797    | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 13:15  
Analyzed: 20-Oct-2017 14:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 12.79    | 6.40            | <b>666</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 13:15  
Analyzed: 14-Oct-2017 11:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | <b>2.64</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 20       | 2.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | <b>10.0</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>4.63</b> | mg/L  | D     |





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**Reported:**  
30-Oct-2017 13:32

**GW-3C1-1-101217-3-8-(20)**  
**17J0197-24RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 13:15  
Analyzed: 18-Oct-2017 22:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>2890</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5**  
**17J0197-25 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/12/2017 14:00  
Analyzed: 17-Oct-2017 12:48

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0448 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>1.29</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>13.6</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.16</b> | ug/L  | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 103   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 91.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101   | %     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5**  
**17J0197-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 14:00  
Analyzed: 23-Oct-2017 20:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.325</b> | ug/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5**  
**17J0197-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 14:00  
Analyzed: 23-Oct-2017 20:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>37.3</b>  | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>0.946</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.671</b> | ug/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5**  
**17J0197-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 14:00  
Analyzed: 27-Oct-2017 13:50

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 14:00  
Analyzed: 23-Oct-2017 12:51

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 115    | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 14.2   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 4.69   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 0.172  | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 15.2   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 42.2   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | 89.8   | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 14:00  
Analyzed: 23-Oct-2017 18:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 14:00  
Analyzed: 23-Oct-2017 18:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>37.5</b>  | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.613</b> | ug/L  |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 14:00  
Analyzed: 24-Oct-2017 15:40

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 14:00  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 100 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>687</b> | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 14:00  
Analyzed: 13-Oct-2017 17:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>128</b> | mg/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/12/2017 14:00

Instrument: Accumet AR60

Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 244    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 244    | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 14:00  
Analyzed: 20-Oct-2017 15:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>12.8</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-3D1-1-101217-4.5-12.5-(20)**  
**17J0197-26RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 14:00  
Analyzed: 14-Oct-2017 12:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 2        | 0.200           | <b>0.606</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>0.571</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 2        | 0.200           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 2        | 0.200           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 0.20            | ND     | mg-P/L | U     |



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Reported:  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3**  
**17J0197-27 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/12/2017 15:30  
Analyzed: 17-Oct-2017 13:08

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0448 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.35</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.27</b>     | ug/L          |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.72</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.49</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>107 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>94.7 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>93.9 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>101 %</i>  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3**  
**17J0197-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 15:30  
Analyzed: 23-Oct-2017 20:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>9.29</b> | ug/L  | D     |





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**Reported:**  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3**  
**17J0197-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 15:30  
Analyzed: 23-Oct-2017 20:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>290</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>12.1</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>3.04</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3**  
**17J0197-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 15:30  
Analyzed: 27-Oct-2017 13:59

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483 Sample Size: 10 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Reported:  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 15:30  
Analyzed: 23-Oct-2017 17:23

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0519</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>2.57</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.235</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>3.96</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0121</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>13.2</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>12.2</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>569</b>    | mg/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 15:30  
Analyzed: 23-Oct-2017 18:41

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | <b>4.21</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 15:30  
Analyzed: 23-Oct-2017 18:41

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>332</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>4.73</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>2.98</b> | ug/L  | D     |



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30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 15:30  
Analyzed: 24-Oct-2017 15:45

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 15:30  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 50 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1370</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/12/2017 15:30  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 622    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 69.5   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 692    | mg/L CaCO3 |       |





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**Reported:**  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 15:30  
Analyzed: 20-Oct-2017 15:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>18.8</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 15:30  
Analyzed: 14-Oct-2017 12:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | 1.72   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | 1.60   | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | 1.94   | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | 18.8   | mg/L  | D     |



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**Reported:**  
30-Oct-2017 13:32

**GW-4D2-1-101217-4.3-9.3-(20)**  
**17J0197-28RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 15:30  
Analyzed: 18-Oct-2017 23:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>431</b> | mg/L  | D     |



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Reported:  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10**  
**17J0197-29 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/12/2017 16:00  
Analyzed: 17-Oct-2017 13:28

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0448 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.25</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 103   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 98.3  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 92.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 103   | %     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10**  
**17J0197-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 16:00  
Analyzed: 23-Oct-2017 19:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.672</b> | ug/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10**  
**17J0197-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 16:00  
Analyzed: 23-Oct-2017 19:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0447 Sample Size: 25 mL  
Prepared: 17-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>148</b>   | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>2.99</b>  | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.730</b> | ug/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10**  
**17J0197-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 16:00  
Analyzed: 27-Oct-2017 14:00

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0483  
Prepared: 18-Oct-2017

Sample Size: 10 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/12/2017 16:00  
Analyzed: 23-Oct-2017 12:55

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0579  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0401</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>2.06</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>2.67</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>5.49</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0424</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>7.98</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>26.3</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>209</b>    | mg/L  |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/12/2017 16:00  
Analyzed: 23-Oct-2017 17:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.236</b> | ug/L  |       |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/12/2017 16:00  
Analyzed: 23-Oct-2017 17:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0489 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>154</b>   | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>1.08</b>  | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.626</b> | ug/L  |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/12/2017 16:00  
Analyzed: 24-Oct-2017 15:46

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0482 Sample Size: 20 mL  
Prepared: 18-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/12/2017 16:00  
Analyzed: 13-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0370 Sample Size: 100 mL  
Prepared: 13-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>572</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/12/2017 16:00  
Analyzed: 17-Oct-2017 10:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0453  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 369    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 369    | mg/L CaCO3 |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/12/2017 16:00  
Analyzed: 20-Oct-2017 15:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>10.9</b> | mg/L  |       |



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Reported:  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 16:00  
Analyzed: 14-Oct-2017 12:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346  
Prepared: 13-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.760</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.48</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.41</b> | mg-P/L |       |



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**Reported:**  
30-Oct-2017 13:32

**GW-3E1-1-101217-5-10-(20)**  
**17J0197-30RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/12/2017 16:00  
Analyzed: 18-Oct-2017 23:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0346 Sample Size: 5 mL  
Prepared: 13-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 20       | 2.00            | <b>25.0</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>50.2</b> | mg/L  | D     |





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Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Trip Blanks**  
**17J0197-31 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/11/2017 00:00  
Analyzed: 16-Oct-2017 11:24

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0400 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 94.1 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.5 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 94.0 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 98.3 % |       |



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Reported:  
30-Oct-2017 13:32

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0354 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0354-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 11:54 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.96            |                 | ug/L  | 5.00        |   | 99.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.11            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.79            |                 | ug/L  | 5.00        |   | 95.8 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.91            |                 | ug/L  | 5.00        |   | 98.2 | 80-120      |      |           |       |
| <b>LCS (BFJ0354-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 09:18 |      |             |      |           |       |
| Vinyl Chloride                           | 8.97   | 0.06            | 0.20            | ug/L  | 10.0        |   | 89.7 | 66-133      |      |           |       |
| Chloroform                               | 9.93   | 0.03            | 0.20            | ug/L  | 10.0        |   | 99.3 | 80-122      |      |           |       |
| Trichloroethene                          | 9.49   | 0.05            | 0.20            | ug/L  | 10.0        |   | 94.9 | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.85            |                 | ug/L  | 5.00        |   | 96.9 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.66            |                 | ug/L  | 5.00        |   | 93.1 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.92            |                 | ug/L  | 5.00        |   | 98.3 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.96            |                 | ug/L  | 5.00        |   | 99.2 | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0354-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 09:44 |      |             |      |           |       |
| Vinyl Chloride                           | 9.26   | 0.06            | 0.20            | ug/L  | 10.0        |   | 92.6 | 66-133      | 3.12 | 30        |       |
| Chloroform                               | 10.1   | 0.03            | 0.20            | ug/L  | 10.0        |   | 101  | 80-122      | 2.07 | 30        |       |
| Trichloroethene                          | 9.94   | 0.05            | 0.20            | ug/L  | 10.0        |   | 99.4 | 80-120      | 4.62 | 30        |       |
| Tetrachloroethene                        | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      | 0.11 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.87            |                 | ug/L  | 5.00        |   | 97.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.80            |                 | ug/L  | 5.00        |   | 96.0 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.98            |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.81            |                 | ug/L  | 5.00        |   | 96.3 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.98            |                 | ug/L  | 5.00        |   | 99.5 | 80-120      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0400 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0400-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 10:32 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.84            |                 | ug/L  | 5.00        |   | 96.8 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.87            |                 | ug/L  | 5.00        |   | 97.4 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.78            |                 | ug/L  | 5.00        |   | 95.6 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.95            |                 | ug/L  | 5.00        |   | 99.0 | 80-120      |      |           |       |
| <b>LCS (BFJ0400-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 08:48 |      |             |      |           |       |
| Vinyl Chloride                    | 10.6   | 0.06            | 0.20            | ug/L  | 10.0        |   | 106  | 66-133      |      |           |       |
| Chloroform                        | 10.0   | 0.03            | 0.20            | ug/L  | 10.0        |   | 100  | 80-122      |      |           |       |
| Trichloroethene                   | 9.72   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.2 | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   |        | 5.03            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.58            |                 | ug/L  | 5.00        |   | 91.6 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.99            |                 | ug/L  | 5.00        |   | 99.9 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.77            |                 | ug/L  | 5.00        |   | 95.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 5.00            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0400-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 09:14 |      |             |      |           |       |
| Vinyl Chloride                    | 10.4   | 0.06            | 0.20            | ug/L  | 10.0        |   | 104  | 66-133      | 1.36 | 30        |       |
| Chloroform                        | 9.91   | 0.03            | 0.20            | ug/L  | 10.0        |   | 99.1 | 80-122      | 0.89 | 30        |       |
| Trichloroethene                   | 9.53   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.3 | 80-120      | 1.93 | 30        |       |
| Tetrachloroethene                 | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      | 3.39 | 30        |       |
| Surrogate: Dibromofluoromethane   |        | 5.00            |                 | ug/L  | 5.00        |   | 99.9 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.72            |                 | ug/L  | 5.00        |   | 94.4 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.99            |                 | ug/L  | 5.00        |   | 99.9 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.82            |                 | ug/L  | 5.00        |   | 96.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.96            |                 | ug/L  | 5.00        |   | 99.1 | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0448 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0448-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 11:47 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.92            |                 | ug/L  | 5.00        |   | 98.4 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.76            |                 | ug/L  | 5.00        |   | 95.2 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.71            |                 | ug/L  | 5.00        |   | 94.3 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.11            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFJ0448-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 10:24 |      |             |      |           |       |
| Vinyl Chloride                           | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      |      |           |       |
| Chloroform                               | 9.53   | 0.03            | 0.20            | ug/L  | 10.0        |   | 95.3 | 80-122      |      |           |       |
| Trichloroethene                          | 11.0   | 0.05            | 0.20            | ug/L  | 10.0        |   | 110  | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |   | 103  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.04            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.56            |                 | ug/L  | 5.00        |   | 91.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.10            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.03            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0448-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 10:44 |      |             |      |           |       |
| Vinyl Chloride                           | 11.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 111  | 66-133      | 9.18 | 30        |       |
| Chloroform                               | 10.2   | 0.03            | 0.20            | ug/L  | 10.0        |   | 102  | 80-122      | 6.30 | 30        |       |
| Trichloroethene                          | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      | 4.69 | 30        |       |
| Tetrachloroethene                        | 10.4   | 0.05            | 0.20            | ug/L  | 10.0        |   | 104  | 80-120      | 0.86 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.42            |                 | ug/L  | 5.00        |   | 108  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.88            |                 | ug/L  | 5.00        |   | 97.6 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.98            |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.10            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0492 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: LH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0492-BLK2)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 09:49 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  |        | 5.24            |                 | ug/L  | 5.00        |   | 105  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.78            |                 | ug/L  | 5.00        |   | 95.5 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.64            |                 | ug/L  | 5.00        |   | 92.9 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 5.10            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFJ0492-BS2)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 08:06 |      |             |      |           |       |
| Vinyl Chloride                    | 10.4   | 0.06            | 0.20            | ug/L  | 10.0        |   | 104  | 66-133      |      |           |       |
| Chloroform                        | 9.78   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.8 | 80-122      |      |           |       |
| Trichloroethene                   | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.4   | 0.05            | 0.20            | ug/L  | 10.0        |   | 104  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   |        | 5.18            |                 | ug/L  | 5.00        |   | 104  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.75            |                 | ug/L  | 5.00        |   | 94.9 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 5.05            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 5.12            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 5.07            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0492-BSD2)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 08:47 |      |             |      |           |       |
| Vinyl Chloride                    | 10.7   | 0.06            | 0.20            | ug/L  | 10.0        |   | 107  | 66-133      | 2.47 | 30        |       |
| Chloroform                        | 9.88   | 0.03            | 0.20            | ug/L  | 10.0        |   | 98.8 | 80-122      | 0.96 | 30        |       |
| Trichloroethene                   | 10.8   | 0.05            | 0.20            | ug/L  | 10.0        |   | 108  | 80-120      | 5.25 | 30        |       |
| Tetrachloroethene                 | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      | 1.28 | 30        |       |
| Surrogate: Dibromofluoromethane   |        | 5.41            |                 | ug/L  | 5.00        |   | 108  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.87            |                 | ug/L  | 5.00        |   | 97.5 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 5.06            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.94            |                 | ug/L  | 5.00        |   | 98.8 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 5.03            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0447 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0447-BLK1)</b>       |         |        |                 |                 |       | Prepared: 17-Oct-2017 Analyzed: 23-Oct-2017 19:38                    |               |      |             |       |           |       |
| Lead                              | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |      |             |       |           | U     |
| Arsenic                           | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |       |           | U     |
| Copper                            | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Copper                            | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel                            | 60      | ND     | 0.0500          | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel                            | 62      | ND     | 0.220           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| <b>LCS (BFJ0447-BS1)</b>          |         |        |                 |                 |       | Prepared: 17-Oct-2017 Analyzed: 23-Oct-2017 20:21                    |               |      |             |       |           |       |
| Lead                              | 208     | 26.4   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 106  | 80-120      |       |           |       |
| Arsenic                           | 75a     | 25.2   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 101  | 80-120      |       |           |       |
| Copper                            | 63      | 27.2   | 0.340           | 0.500           | ug/L  | 25.0   |               | 109  | 80-120      |       |           |       |
| Copper                            | 65      | 26.4   | 0.350           | 0.500           | ug/L  | 25.0   |               | 106  | 80-120      |       |           |       |
| Nickel                            | 60      | 25.2   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 101  | 80-120      |       |           |       |
| Nickel                            | 62      | 25.9   | 0.220           | 0.500           | ug/L  | 25.0   |               | 104  | 80-120      |       |           |       |
| <b>Duplicate (BFJ0447-DUP1)</b>   |         |        |                 |                 |       | Source: 17J0197-25 Prepared: 17-Oct-2017 Analyzed: 23-Oct-2017 20:07 |               |      |             |       |           |       |
| Lead                              | 208     | 0.435  | 0.0680          | 0.100           | ug/L  |  | 0.325         |      |             | 28.90 | 20        | *     |
| Arsenic                           | 75a     | 37.7   | 0.0220          | 0.200           | ug/L  |  | 37.3          |      |             | 1.02  | 20        |       |
| Copper                            | 63      | 0.852  | 0.340           | 0.500           | ug/L  |  | 0.946         |      |             | 10.50 | 20        |       |
| Nickel                            | 60      | 0.620  | 0.0500          | 0.500           | ug/L  |  | 0.671         |      |             | 7.90  | 20        |       |
| <b>Matrix Spike (BFJ0447-MS1)</b> |         |        |                 |                 |       | Source: 17J0197-25 Prepared: 17-Oct-2017 Analyzed: 23-Oct-2017 20:16 |               |      |             |       |           |       |
| Lead                              | 208     | 25.0   | 0.0680          | 0.100           | ug/L  | 25.0   | 0.325         | 98.7 | 75-125      |       |           |       |
| Arsenic                           | 75a     | 63.8   | 0.0220          | 0.200           | ug/L  | 25.0   | 37.3          | 106  | 75-125      |       |           |       |
| Copper                            | 63      | 25.9   | 0.340           | 0.500           | ug/L  | 25.0   | 0.946         | 99.9 | 75-125      |       |           |       |
| Nickel                            | 60      | 26.0   | 0.0500          | 0.500           | ug/L  | 25.0   | 0.671         | 101  | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0483 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0483-BLK1)</b>       |         |                           |       |             |   |      |             |     |           |       |
|                                   |         |                           |       |             | Prepared: 18-Oct-2017 Analyzed: 27-Oct-2017 13:23 |      |             |     |           |       |
| Mercury                           | ND      | 0.000100                  | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0483-BS1)</b>          |         |                           |       |             |   |      |             |     |           |       |
|                                   |         |                           |       |             | Prepared: 18-Oct-2017 Analyzed: 27-Oct-2017 13:25 |      |             |     |           |       |
| Mercury                           | 0.00222 | 0.000100                  | mg/L  | 0.00200     |   | 111  | 80-120      |     |           |       |
| <b>Duplicate (BFJ0483-DUP1)</b>   |         |                           |       |             |   |      |             |     |           |       |
|                                   |         | <b>Source: 17J0197-25</b> |       |             | Prepared: 18-Oct-2017 Analyzed: 27-Oct-2017 13:52 |      |             |     |           |       |
| Mercury                           | ND      | 0.000100                  | mg/L  |             | ND  |      |             |     |           | U     |
| <b>Matrix Spike (BFJ0483-MS1)</b> |         |                           |       |             |   |      |             |     |           |       |
|                                   |         | <b>Source: 17J0197-25</b> |       |             | Prepared: 18-Oct-2017 Analyzed: 27-Oct-2017 13:53 |      |             |     |           |       |
| Mercury                           | 0.00109 | 0.000100                  | mg/L  | 0.00100     | ND  | 106  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0482 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0482-BLK1)</b>       |         |                           |       |             |   |      |             |     |           |       |
|                                   |         |                           |       |             | Prepared: 18-Oct-2017 Analyzed: 24-Oct-2017 15:10 |      |             |     |           |       |
| Mercury, Dissolved                | ND      | 0.000100                  | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0482-BS1)</b>          |         |                           |       |             |   |      |             |     |           |       |
|                                   |         |                           |       |             | Prepared: 18-Oct-2017 Analyzed: 24-Oct-2017 15:11 |      |             |     |           |       |
| Mercury, Dissolved                | 0.00218 | 0.000100                  | mg/L  | 0.00200     |   | 109  | 80-120      |     |           |       |
| <b>Duplicate (BFJ0482-DUP1)</b>   |         |                           |       |             |   |      |             |     |           |       |
|                                   |         | <b>Source: 17J0197-26</b> |       |             | Prepared: 18-Oct-2017 Analyzed: 24-Oct-2017 15:42 |      |             |     |           |       |
| Mercury, Dissolved                | ND      | 0.000100                  | mg/L  |             | ND  |      |             |     |           | U     |
| <b>Matrix Spike (BFJ0482-MS1)</b> |         |                           |       |             |   |      |             |     |           |       |
|                                   |         | <b>Source: 17J0197-26</b> |       |             | Prepared: 18-Oct-2017 Analyzed: 24-Oct-2017 15:43 |      |             |     |           |       |
| Mercury, Dissolved                | 0.00113 | 0.000100                  | mg/L  | 0.00100     | ND  | 106  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0489 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0489-BLK1)</b>       |         |        |                 |                 |       | Prepared: 18-Oct-2017 Analyzed: 23-Oct-2017 16:38                    |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |      |             |      |           | U     |
| Arsenic, Dissolved                | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |      |           | U     |
| Copper, Dissolved                 | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |      |             |      |           | U     |
| Copper, Dissolved                 | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |      |             |      |           | U     |
| Nickel, Dissolved                 | 60      | ND     | 0.0500          | 0.500           | ug/L  |  |               |      |             |      |           | U     |
| Nickel, Dissolved                 | 62      | ND     | 0.220           | 0.500           | ug/L  |  |               |      |             |      |           | U     |
| <b>LCS (BFJ0489-BS1)</b>          |         |        |                 |                 |       | Prepared: 18-Oct-2017 Analyzed: 23-Oct-2017 18:19                    |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | 28.3   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 113  | 80-120      |      |           |       |
| Arsenic, Dissolved                | 75a     | 25.7   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 103  | 80-120      |      |           |       |
| Copper, Dissolved                 | 63      | 27.4   | 0.340           | 0.500           | ug/L  | 25.0   |               | 110  | 80-120      |      |           |       |
| Copper, Dissolved                 | 65      | 27.4   | 0.350           | 0.500           | ug/L  | 25.0   |               | 110  | 80-120      |      |           |       |
| Nickel, Dissolved                 | 60      | 26.1   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 104  | 80-120      |      |           |       |
| Nickel, Dissolved                 | 62      | 26.7   | 0.220           | 0.500           | ug/L  | 25.0   |               | 107  | 80-120      |      |           |       |
| <b>Duplicate (BFJ0489-DUP1)</b>   |         |        |                 |                 |       | Source: 17J0197-26 Prepared: 18-Oct-2017 Analyzed: 23-Oct-2017 18:05 |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680          | 0.100           | ug/L  |  | ND            |      |             |      |           | U     |
| Arsenic, Dissolved                | 75a     | 38.2   | 0.0220          | 0.200           | ug/L  |  | 37.5          |      |             | 1.91 | 20        |       |
| Copper, Dissolved                 | 63      | ND     | 0.340           | 0.500           | ug/L  |  | ND            |      |             |      |           | U     |
| Nickel, Dissolved                 | 60      | 0.658  | 0.0500          | 0.500           | ug/L  |  | 0.613         |      |             | 7.08 | 20        |       |
| <b>Matrix Spike (BFJ0489-MS1)</b> |         |        |                 |                 |       | Source: 17J0197-26 Prepared: 18-Oct-2017 Analyzed: 23-Oct-2017 18:14 |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | 25.1   | 0.0680          | 0.100           | ug/L  | 25.0   | ND            | 100  | 75-125      |      |           |       |
| Arsenic, Dissolved                | 75a     | 61.9   | 0.0220          | 0.200           | ug/L  | 25.0   | 37.5          | 97.5 | 75-125      |      |           |       |
| Copper, Dissolved                 | 63      | 25.0   | 0.340           | 0.500           | ug/L  | 25.0   | ND            | 100  | 75-125      |      |           |       |
| Nickel, Dissolved                 | 60      | 25.5   | 0.0500          | 0.500           | ug/L  | 25.0   | 0.613         | 99.6 | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0579 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0579-BLK1)</b> |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 23-Oct-2017 14:27 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0039 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.186  | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFJ0579-BS1)</b> |       |        |        |      |       |   |      |        |  |  |   |
|                          |       |        |        |      |       | Prepared: 20-Oct-2017 Analyzed: 23-Oct-2017 14:45 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.00  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 99.9 | 80-120 |  |  |   |
| Calcium, Dissolved       | 9.99  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 99.9 | 80-120 |  |  |   |
| Iron, Dissolved          | 2.05  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 103  | 80-120 |  |  |   |
| Magnesium, Dissolved     | 10.4  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 104  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.486 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 97.2 | 80-120 |  |  |   |
| Potassium, Dissolved     | 10.0  | 0.0520 | 0.500  | mg/L | 10.0  |   | 100  | 80-120 |  |  |   |
| Silicon, Dissolved       | 10.2  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 102  | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.0  | 0.0114 | 0.500  | mg/L | 10.0  |   | 100  | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.48  | 1.90   | 50.0   | mg/L | 10.0  |   | 94.8 | 80-120 |  |  | J |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

Wet Chemistry - Quality Control

Batch BFJ0346 - No Prep Wet Chem

Instrument: DX500 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0346-BLK1)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Prepared: 13-Oct-2017 Analyzed: 14-Oct-2017 10:35                       |        |                 |        |             |               |      |             |       |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |       |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |       |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |       |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |       |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |       |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |       |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |       |           | U     |
| <b>LCS (BFJ0346-BS1)</b>  |        |                 |        |             |               |      |             |       |           |       |
| Prepared: 13-Oct-2017 Analyzed: 14-Oct-2017 10:52                       |        |                 |        |             |               |      |             |       |           |       |
| Bromide   | 1.46   | 0.100           | mg/L   | 1.50        |               | 97.3 | 75-125      |       |           |       |
| Chloride  | 1.57   | 0.100           | mg/L   | 1.50        |               | 104  | 75-125      |       |           |       |
| Fluoride  | 1.56   | 0.100           | mg/L   | 1.50        |               | 104  | 75-125      |       |           |       |
| Nitrate-N   | 1.52   | 0.100           | mg-N/L | 1.50        |               | 101  | 75-125      |       |           |       |
| Nitrite-N   | 1.54   | 0.100           | mg-N/L | 1.50        |               | 102  | 75-125      |       |           |       |
| Orthophosphorus   | 1.52   | 0.10            | mg-P/L | 1.50        |               | 101  | 75-125      |       |           |       |
| Sulfate   | 1.55   | 0.100           | mg/L   | 1.50        |               | 103  | 75-125      |       |           |       |
| <b>Duplicate (BFJ0346-DUP1)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0197-02 Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 09:37    |        |                 |        |             |               |      |             |       |           |       |
| Nitrite-N   | ND     | 10.0            | mg-N/L |             | ND            |      |             |       |           | U     |
| <b>Duplicate (BFJ0346-DUP2)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0197-02RE1 Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 14:05 |        |                 |        |             |               |      |             |       |           |       |
| Bromide   | 2.00   | 2.00            | mg/L   |             | ND            |      |             |       |           | D     |
| Fluoride  | 8.15   | 2.00            | mg/L   |             | 8.02          |      |             | 1.51  | 20        | D     |
| Nitrate-N   | ND     | 2.00            | mg-N/L |             | ND            |      |             |       |           | H, U  |
| Orthophosphorus   | 20.2   | 2.00            | mg-P/L |             | 20.4          |      |             | 0.89  | 20        | H, D  |
| Sulfate   | 3.61   | 2.00            | mg/L   |             | 4.17          |      |             | 14.40 | 20        | D     |
| <b>Duplicate (BFJ0346-DUP5)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0197-02RE3 Prepared: 13-Oct-2017 Analyzed: 18-Oct-2017 19:21 |        |                 |        |             |               |      |             |       |           |       |
| Chloride  | 3450   | 200             | mg/L   |             | 3560          |      |             | 3.19  | 20        | D     |
| <b>Duplicate (BFJ0346-DUP6)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0197-02RE3 Prepared: 13-Oct-2017 Analyzed: 18-Oct-2017 19:37 |        |                 |        |             |               |      |             |       |           |       |
| Chloride  | 3710   | 200             | mg/L   |             | 3560          |      |             | 4.04  | 20        | D     |
| <b>Matrix Spike (BFJ0346-MS1)</b>                                       |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0197-02 Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 09:53    |        |                 |        |             |               |      |             |       |           |       |
| Nitrite-N   | ND     | 10.0            | mg-N/L | 20.0        | ND            |      | 75-125      |       |           | *, U  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

Wet Chemistry - Quality Control

Batch BFJ0346 - No Prep Wet Chem

Instrument: DX500 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit              | Units  | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|------------------------------|--------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0346-MS2)</b> |        | <b>Source: 17J0197-02RE1</b> |        | Prepared: 13-Oct-2017 |               | Analyzed: 13-Oct-2017 14:22 |             |     |           |       |
| Bromide                           | 26.7   | 2.00                         | mg/L   | 20.0                  | ND            | 133                         | 75-125      |     |           | *, D  |
| Fluoride                          | 27.5   | 2.00                         | mg/L   | 20.0                  | 8.02          | 97.3                        | 75-125      |     |           | D     |
| Nitrate-N                         | 20.5   | 2.00                         | mg-N/L | 20.0                  | ND            | 102                         | 75-125      |     |           | H, D  |
| Orthophosphorus                   | 39.3   | 2.00                         | mg-P/L | 20.0                  | 20.4          | 94.6                        | 75-125      |     |           | H, D  |
| Sulfate                           | 23.1   | 2.00                         | mg/L   | 20.0                  | 4.17          | 94.9                        | 75-125      |     |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**Wet Chemistry - Quality Control**

**Batch BFJ0370 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0370-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 12:31 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0370-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 12:31 |      |             |      |           |       |
| Dissolved Solids                | 504    | 5.0                       | mg/L  | 500         |   | 101  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0370-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17J0197-02</b> |       |             | Prepared: 13-Oct-2017 Analyzed: 13-Oct-2017 12:31 |      |             |      |           |       |
| Dissolved Solids                | 6700   | 200                       | mg/L  |             | 6340  |      |             | 5.52 | 20        |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**Wet Chemistry - Quality Control**

**Batch BFJ0453 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level                                       | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|------------|---|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0453-BLK1)</b>     |        | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 10:01 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| <b>Duplicate (BFJ0453-DUP1)</b> |        | <b>Source: 17J0197-02</b>                         |            | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 10:01 |               |      |              |      |           |       |
| Alkalinity, Total               | 567    | 1.00  | mg/L CaCO3 |   | 563           |      |              | 0.70 | 20        |       |
| <b>Reference (BFJ0453-SRM1)</b> |        | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 10:01 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | 105    | 1.00  | mg/L CaCO3 | 108   |               | 97.4 | 90.37-108.33 |      |           |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

**Wet Chemistry - Quality Control**

**Batch BFJ0549 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: GM

| QC Sample/Analyte                   | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-------------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0549-BLK1)</b>         |        |                           |       |             |   |      |             |      |           |       |
|                                     |        |                           |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 07:32 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50                      | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0549-BS1)</b>            |        |                           |       |             |   |      |             |      |           |       |
|                                     |        |                           |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 07:50 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 20.1   | 0.50                      | mg/L  | 20.0        |   | 101  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0549-DUP1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                     |        | <b>Source: 17J0197-02</b> |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 08:39 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 233    | 0.50                      | mg/L  |             | 236   |      |             | 1.45 | 20        |       |
| <b>Matrix Spike (BFJ0549-MS2)</b>   |        |                           |       |             |   |      |             |      |           |       |
|                                     |        | <b>Source: 17J0197-02</b> |       |             | Prepared: 19-Oct-2017 Analyzed: 24-Oct-2017 19:28 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 732    | 50.0                      | mg/L  | 500         | 236   | 99.0 | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
30-Oct-2017 13:32

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation

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Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2017 13:32

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2017 13:32

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



31 October 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0239

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 79227 Turn-around Requested: Normal  
 ARI Client Company: Pioneer Technologies Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227 Samplers: DG Cooper 206-660-3466

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID                      | Date     | Time | Matrix | No. Containers | Analysis Requested                          |   |  |   |   |  |                                      | Notes/Comments |                            |  |
|--------------------------------|----------|------|--------|----------------|---|---|--|---|---|--|--------------------------------------|----------------|----------------------------|--|
|                                |          |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 |                | Dissolved DOC<br>SM 5310 B |  |
| GW-2B1-1-101317-3-10           | 10/13/17 | 0845 | Water  | 4              | X   |   |  |   |   |  |                                      |                |                            | Dissolved Samples Field filtered 0.45 um |
| GW-2B1-1-101317-3-10-(20)      |          | 0845 |        | 5              | X   | X   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-2B2-2-101317-30.5-35.6      |          | 0900 |        | 4              | X   |   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-2B2-2-101317-30.8-35.8-(20) |          | 0900 |        | 5              | X   | X   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-2A1-1-101317-9-14           |          | 1015 |        | 4              | X   |   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-2A1-1-101317-9-14-(20)      |          | 1015 |        | 5              | X   |   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-4B3-1-101317-4.5-10.5       |          | 1030 |        | 4              | X   |   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-4B3-1-101317-4.5-10.5-(20)  |          | 1030 |        | 5              | X   | X   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-4B2-2-101317-22.5-27.5-(20) |          | 1145 |        | 5              | X   |   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-4B2-2-101317-22.5-27.5      |          | 1145 |        | 4              | X   |   |  | X   | X   | X  | X                                    |                |                            |  |
| GW-4B3-2-101317-17.5-27.5      |          | 1230 |        | 4              | X   |   |  | X   | X   | X  | X                                    |                |                            |  |

Comments/Special Instructions: Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227

Relinquished by: [Signature] Date & Time: 10/13/17 1510  
 Printed Name: Shelly Fisher Company: ARI

Received by: [Signature] Date & Time: 10/13/17 1510  
 Printed Name: Shelly Fisher Company: ARI

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **Normal**

ARI Client Company: **Pioneer Technologies**

Client Contact: **Troy Bussey (busseyt@uspioneer.com)**

Client Project Name: **Arkema FS DG Inv 79227**

Turn-around Requested: **10/13/17**

Phone: **360-570-1700**

Sampler: **DG Cooper 206-660-3466**

No. of Coolers: **2**

Cooler Temps: **2**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID                      | Date     | Time | Matrix | No. Containers | Analysis Requested                          |  |  |   |   |  |                                     |                            | Notes/Comments                                       |
|--------------------------------|----------|------|--------|----------------|---|--|--|---|---|--|-------------------------------------|----------------------------|--|
|                                |          |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/PA 160.1 | Dissolved DOC<br>SM 5310 B |  |
| GW-4B3-2-101317-17.5-27.5-(20) | 10/13/17 | 1230 | Water  | 5              | X   | X  | X  | X   | X   | X  | X                                   | X                          | Dissolved<br>Samples are<br>field filtered<br>0.45 μ |
| GW-361-2-101317-17.5-22.5      | 10/13/17 | 1330 | ↓      | 4              | X   | X  | X  | X   | X   | X  | X                                   | X                          |  |
| GW-361-2-101317-17.5-22.5-(20) | ↓        | 1330 | ↓      | 5              | X   | X  | X  | X   | X   | X  | X                                   | X                          |  |
| GW-4F1-1-101317-4.5-9.5        | ↓        | 1345 | ↓      | 4              | X   | X  | X  | X   | X   | X  | X                                   | X                          |  |
| GW-4F1-1-101317-4.5-9.5-(20)   | ↓        | 1345 | ↓      | 5              | X   | X  | X  | X   | X   | X  | X                                   | X                          |  |

Comments/Special Instructions: **Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227**

Relinquished by: **[Signature]**  
 Received by: **[Signature]**

Printed Name: **DG COOPER**  
 Printed Name: **Shelly Fisher**

Company: **PTC**  
 Company: **ARI**

Date & Time: **10/13/17 1510**  
 Date & Time: **10/13/17 1510**

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Cooler Receipt Form

ARI Client: Pioneer

Project Name: \_\_\_\_\_

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: \_\_\_\_\_

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 7.1 9.3

Time: 1510

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005206

Cooler Accepted by: [Signature] Date: 10/13/17 Time: 1510

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO

Were all VOC vials free of air bubbles? ..... NA  YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI ..... NA

Was Sample Split by ARI :  NA  YES  Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

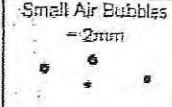
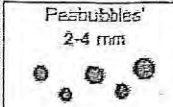
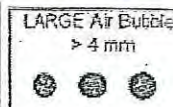
**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

GW-2B1-1-101317-3-10 and ~~GW-2B1-1-101317-3-10~~ bot'  
has HS

By: SLF Date: 10/13/17

|  |  |   |                                 |
|--|--|---|---------------------------------|
|  Small Air Bubbles<br>= 2mm |  Peabubbles<br>2-4 mm |  LARGE Air Bubbles<br>> 4 mm | Small → "sm" (< 2 mm)           |
|  |  |   | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |   | Large → "lg" (4 to < 6 mm)      |
|  |  |   | Headspace → "hs" (> 6 mm)       |







WORK ORDER

17J0239

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigation Project Number: Port of Tacoma Arkema- FS Data Gap Investigation

Preservation Confirmation

| Container ID | Container Type                    | pH         |
|--------------|-----------------------------------|------------|
| 17J0239-01 A | VOA Vial, Amber, 40 mL, HCL       | head space |
| 17J0239-01 B | VOA Vial, Amber, 40 mL, HCL       | head space |
| 17J0239-01 C | VOA Vial, Amber, 40 mL, HCL       | head space |
| 17J0239-01 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass   |
| 17J0239-02 A | Small OJ, 500 mL                  |            |
| 17J0239-02 B | Small OJ, 500 mL                  |            |
| 17J0239-02 C | Large OJ, 1000 mL                 |            |
| 17J0239-02 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2: fail  |
| 17J0239-02 E | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass   |
| 17J0239-03 A | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-03 B | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-03 C | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-03 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2: fail  |
| 17J0239-04 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass   |
| 17J0239-04 B | Small OJ, 500 mL                  |            |
| 17J0239-04 C | Small OJ, 500 mL                  |            |
| 17J0239-04 D | Large OJ, 1000 mL                 |            |
| 17J0239-04 E | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2: fail  |
| 17J0239-05 A | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-05 B | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-05 C | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-05 D | HDPE NM, 500 mL, 1:1 HNO3         |            |
| 17J0239-06 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass   |
| 17J0239-06 B | Small OJ, 500 mL                  |            |
| 17J0239-06 C | Small OJ, 500 mL                  |            |
| 17J0239-06 D | Large OJ, 1000 mL                 |            |
| 17J0239-06 E | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 pass   |
| 17J0239-07 A | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-07 B | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-07 C | VOA Vial, Amber, 40 mL, HCL       |            |
| 17J0239-07 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass   |





WORK ORDER

17J0239

| Client: Pioneer Technologies Corporation                  |                                   | Project Manager: Amanda Volgardsen                               |
|---|-----------------------------------|--|
| Project: Port of Tacoma Arkema- FS Data Gap Investigation |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investigation |
| 17J0239-08 A  | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass  |
| 17J0239-08 B  | Small OJ, 500 mL                  |  |
| 17J0239-08 C  | Small OJ, 500 mL                  |  |
| 17J0239-08 D  | Large OJ, 1000 mL                 |  |
| 17J0239-08 E  | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 pass  |
| 17J0239-09 A  | Glass NM, Amber, 250 mL, 9N H2SO4 |  |
| 17J0239-09 B  | Small OJ, 500 mL                  |  |
| 17J0239-09 C  | Small OJ, 500 mL                  |  |
| 17J0239-09 D  | Large OJ, 1000 mL                 |  |
| 17J0239-09 E  | HDPE NM, 1000 mL, 1:1 HNO3 (FF)   | <2 pass  |
| 17J0239-10 A  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-10 B  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-10 C  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-10 D  | HDPE NM, 500 mL, 1:1 HNO3         | >2: fail   |
| 17J0239-11 A  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-11 B  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-11 C  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-11 D  | HDPE NM, 500 mL, 1:1 HNO3         | >2: fail   |
| 17J0239-12 A  | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass  |
| 17J0239-12 B  | Small OJ, 500 mL                  |  |
| 17J0239-12 C  | Small OJ, 500 mL                  |  |
| 17J0239-12 D  | Large OJ, 1000 mL                 |  |
| 17J0239-12 E  | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2: fail   |
| 17J0239-13 A  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-13 B  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-13 C  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-13 D  | HDPE NM, 500 mL, 1:1 HNO3         | <2 pass  |
| 17J0239-14 A  | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass  |
| 17J0239-14 B  | Small OJ, 500 mL                  |  |
| 17J0239-14 C  | Small OJ, 500 mL                  |  |
| 17J0239-14 D  | Large OJ, 1000 mL                 |  |
| 17J0239-14 E  | HDPE NM, 1000 mL, 1:1 HNO3 (FF)   | >2: fail   |
| 17J0239-15 A  | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0239-15 B  | VOA Vial, Amber, 40 mL, HCL       |  |



**WORK ORDER**

17J0239

|  |                                   |   |
|--|-----------------------------------|---|
| <b>Client: Pioneer Technologies Corporation</b>                  |                                   | <b>Project Manager: Amanda Volgardsen</b>                               |
| <b>Project: Port of Tacoma Arkema- FS Data Gap Investigation</b> |                                   | <b>Project Number: Port of Tacoma Arkema- FS Data Gap Investigation</b> |
| 17J0239-15 C   | VOA Vial, Amber, 40 mL, HCL       |   |
| 17J0239-15 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2 pass   |
| 17J0239-16 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass   |
| 17J0239-16 B   | Small OJ, 500 mL                  |   |
| 17J0239-16 C   | Small OJ, 500 mL                  |   |
| 17J0239-16 D   | Large OJ, 1000 mL                 |   |
| 17J0239-16 E   | HDPE NM, 1000 mL, 1:1 HNO3 (FF)   | <2 pass   |

Preservation Confirmed By \_\_\_\_\_

Date \_\_\_\_\_

Reviewed By \_\_\_\_\_

Date \_\_\_\_\_

# Chain of Custody Record & Laboratory Analysis Request

**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)  
www.arilabs.com



Page: \_\_\_\_\_ of \_\_\_\_\_  
Date: \_\_\_\_\_ Ice Present?   
No. of Coolers: \_\_\_\_\_ Cooler Temps: \_\_\_\_\_

Analysis Requested  
fiscal laboratory

|                |  |
|----------------|--|
| Notes/Comments |  |
|----------------|--|

ARI Assigned Number: 17J0329  
ARI Client Company: City of Des Moines Phone: 253 948 8077  
Client Contact: Anthony B Jones  
Client Project Name: \_\_\_\_\_  
Client Project #: \_\_\_\_\_  
Samplers: \_\_\_\_\_

| Sample ID         | Date       | Time   | Matrix | No. Containers |
|-------------------|------------|--------|--------|----------------|
| fiscal laboratory | 10/19/2017 | 9:30AM |        |                |
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|  |                                      |                                   |
|--|--------------------------------------|-----------------------------------|
| Comments/Special Instructions          | Relinquished by: (Signature)         | Received by: (Signature)          |
|  | Printed Name: <u>ANTHONY B JONES</u> | Printed Name: <u>BRANDON FISK</u> |
| Company: <u>CITY OF DES MOINES</u>     | Company: <u>ARI</u>                  | Company: _____                    |
| Date & Time: <u>10/19/2017 10:46AM</u> | Date & Time: <u>10/19/17</u>         | Date & Time: _____                |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.





# Cooler Receipt Form

ARI Client: City of Des Moines

COC No(s): \_\_\_\_\_ NA

Assigned ARI Job No: 17J0329

Project Name: \_\_\_\_\_

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? \_\_\_\_\_

YES  NO

Were custody papers included with the cooler? \_\_\_\_\_

YES  NO

Were custody papers properly filled out (ink, signed, etc.) \_\_\_\_\_

YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time: \_\_\_\_\_ 16.4 \_\_\_\_\_

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 2002506

Cooler Accepted by: BF Date: 10/19/17 Time: 1047

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? \_\_\_\_\_

YES  NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: NONE

Was sufficient ice used (if appropriate)? \_\_\_\_\_

NA YES  NO

Were all bottles sealed in individual plastic bags? \_\_\_\_\_

YES  NO

Did all bottles arrive in good condition (unbroken)? \_\_\_\_\_

YES  NO

Were all bottle labels complete and legible? \_\_\_\_\_

YES  NO

Did the number of containers listed on COC match with the number of containers received? \_\_\_\_\_

YES  NO

Did all bottle labels and tags agree with custody papers? \_\_\_\_\_

YES  NO

Were all bottles used correct for the requested analyses? \_\_\_\_\_

YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...

NA YES  NO

Were all VOC vials free of air bubbles? \_\_\_\_\_

NA YES  NO

Was sufficient amount of sample sent in each bottle? \_\_\_\_\_

YES  NO

Date VOC Trip Blank was made at ARI: \_\_\_\_\_

NA

Was Sample Split by ARI: NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: SF Date: 10/19/17 Time: 1105

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

Sample time on bottle is 756 on COC its 956

By: SF Date: 10/19/17

|                                    |                              |  |  |
|------------------------------------|------------------------------|--|--|
| <p>Small Air Bubbles<br/>= 2mm</p> | <p>Peabubbles<br/>2-4 mm</p> | <p>LARGE Air Bubbles<br/>&gt; 4 mm</p> | <p>Small → "sm" (&lt; 2 mm)</p> <p>Peabubbles → "pb" (2 to &lt; 4 mm)</p> <p>Large → "lg" (4 to &lt; 6 mm)</p> <p>Headspace → "hs" (&gt; 6 mm)</p> |
|------------------------------------|------------------------------|--|--|



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                      | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|--------------------------------|---------------|--------|-------------------|-------------------|
| GW-2B1-1-101317-3-10           | 17J0239-01    | Water  | 13-Oct-2017 08:45 | 13-Oct-2017 17:33 |
| GW-2B1-1-101317-3-10-(20)      | 17J0239-02    | Water  | 13-Oct-2017 08:45 | 13-Oct-2017 17:33 |
| GW-2B2-2-101317-30.8-35.8      | 17J0239-03    | Water  | 13-Oct-2017 09:00 | 13-Oct-2017 17:33 |
| GW-2B2-2-101317-30.8-35.8-(20) | 17J0239-04    | Water  | 13-Oct-2017 09:00 | 13-Oct-2017 17:33 |
| GW-2A1-1-101317-9-14           | 17J0239-05    | Water  | 13-Oct-2017 10:15 | 13-Oct-2017 17:33 |
| GW-2A1-1-101317-9-14-(20)      | 17J0239-06    | Water  | 13-Oct-2017 10:15 | 13-Oct-2017 17:33 |
| GW-4B3-1-101317-4.5-10.5       | 17J0239-07    | Water  | 13-Oct-2017 10:30 | 13-Oct-2017 17:33 |
| GW-4B3-1-101317-4.5-10.5-(20)  | 17J0239-08    | Water  | 13-Oct-2017 10:30 | 13-Oct-2017 17:33 |
| GW-4B2-2-101317-22.5-27.5-(20) | 17J0239-09    | Water  | 13-Oct-2017 11:45 | 13-Oct-2017 17:33 |
| GW-4B2-2-101317-22.5-27.5      | 17J0239-10    | Water  | 13-Oct-2017 11:45 | 13-Oct-2017 17:33 |
| GW-4B3-2-101317-17.5-27.5      | 17J0239-11    | Water  | 13-Oct-2017 12:30 | 13-Oct-2017 17:33 |
| GW-4B3-2-101317-17.5-27.5-(20) | 17J0239-12    | Water  | 13-Oct-2017 12:30 | 13-Oct-2017 17:33 |
| GW-3E1-2-101317-17.5-22.5      | 17J0239-13    | Water  | 13-Oct-2017 13:30 | 13-Oct-2017 17:33 |
| GW-3E1-2-101317-17.5-22.5-(20) | 17J0239-14    | Water  | 13-Oct-2017 13:30 | 13-Oct-2017 17:33 |
| GW-4F1-1-101317-4.5-9.5        | 17J0239-15    | Water  | 13-Oct-2017 13:45 | 13-Oct-2017 17:33 |
| GW-4F1-1-101317-4.5-9.5-(20)   | 17J0239-16    | Water  | 13-Oct-2017 13:45 | 13-Oct-2017 17:33 |
| Trip Blank                     | 17J0239-17    | Water  | 13-Oct-2017 00:00 | 13-Oct-2017 17:33 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 13, 2017 under ARI workorder 17J0239. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Sample GW-4B2-2-101317-22.5-27.5 was reanalyzed at a higher reporting limits due to a Chloroform concentration exceeding the upper range of the calibrations, this analyte has been flagged with "E" qualifiers. The final reanalysis was free of "E" flags. All re-analyses were reported. No further corrective action was taken.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Anions - EPA Method 300.0

Select samples were re-analyzed outside of the recommended holding times due to the high concentration of Chloride. These samples have been flagged with an "H" qualifier.

The samples were started at a 100x dilution due to the historically high Chloride. Also due to the high Chloride as well as matrix interference some of the peaks for Nitrates may appear as non-detects.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-2B1-101317-3-10-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

### Dissolved Organic Carbon - Method SM5310

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.





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Reported:  
31-Oct-2017 16:42

A matrix spike and duplicate were prepared in conjunction with sample GW-4B3-2-101317-17.5-27.5-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-2B1-101317-3-10-(20). The duplicate RPD was within QC limits.

#### **Alkalinity - Method SM2320**

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-2B1-101317-3-10-(20). The duplicate RPD was within QC limits.

#### **Total and Dissolved Metals - EPA Method 200.8**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Iron and Sodium detected below the reporting limits, but above the method detection limits. These metals have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.



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Reported:  
31-Oct-2017 16:42

**Total and Dissolved Hg - EPA Method 7470/7471**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10**  
**17J0239-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 08:45  
Analyzed: 16-Oct-2017 14:58

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0418 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.15</b> | ug/L   | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.04</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 107 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 95.4 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 104 %  |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10**  
**17J0239-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 08:45  
Analyzed: 23-Oct-2017 21:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>7.56</b> | ug/L  | D     |



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Olympia WA, 98503

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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10**  
**17J0239-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 08:45  
Analyzed: 23-Oct-2017 21:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>146</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>9.78</b> | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>8.22</b> | ug/L  | J, D  |



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Olympia WA, 98503

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**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10**  
**17J0239-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 08:45  
Analyzed: 18-Oct-2017 13:58

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0443  
Prepared: 17-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/13/2017 08:45  
Analyzed: 27-Oct-2017 15:25

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.957</b> | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>106</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>38.5</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>48.6</b>  | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.354</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>28.3</b>  | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>17.2</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>3650</b>  | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 08:45  
Analyzed: 27-Oct-2017 15:27

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>9.50</b> | ug/L  | D     |





Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/13/2017 08:45  
Analyzed: 30-Oct-2017 17:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | 147    | ug/L  | D     |

Instrument: ICPMS2 Analyzed: 27-Oct-2017 15:27

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 20       | 6.80            | 10.0            | 13.3   | ug/L  | D     |
| Nickel, Dissolved | 7440-02-0  | 20       | 1.00            | 10.0            | 10.6   | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 08:45  
Analyzed: 18-Oct-2017 14:27

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0451 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/13/2017 08:45  
Analyzed: 16-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0436 Sample Size: 5 mL  
Prepared: 16-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>8760</b> | mg/L  |       |



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Reported:  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/13/2017 08:45  
Analyzed: 17-Oct-2017 14:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0471 Sample Size: 50 mL  
Prepared: 17-Oct-2017 Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>804</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>804</b> | mg/L CaCO3 |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/13/2017 08:45  
Analyzed: 20-Oct-2017 16:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>160</b> | mg/L  |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 08:45  
Analyzed: 14-Oct-2017 17:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391  
Prepared: 14-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | 3.95   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 20       | 2.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 20       | 2.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | 6.11   | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | 6.21   | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B1-1-101317-3-10-(20)**  
**17J0239-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 08:45  
Analyzed: 22-Oct-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>5270</b> | mg/L  | D     |



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Reported:  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8**  
**17J0239-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 09:00  
Analyzed: 16-Oct-2017 15:19

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0418 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | 2.67     | ug/L   |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 117 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.1 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 95.3 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 106 %  |       |





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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8**  
**17J0239-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 09:00  
Analyzed: 23-Oct-2017 21:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8**  
**17J0239-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 09:00  
Analyzed: 23-Oct-2017 21:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>7.88</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 7.00            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>1.02</b> | ug/L  | J, D  |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8**  
**17J0239-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 09:00  
Analyzed: 18-Oct-2017 13:59

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0443 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/13/2017 09:00  
Analyzed: 27-Oct-2017 15:06

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 50       | 0.425           | 2.50            | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 50       | 0.255           | 2.50            | 232    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 50       | 0.0650          | 2.50            | 24.8   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 50       | 0.800           | 2.50            | 173    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 50       | 0.0170          | 0.0500          | 5.60   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 50       | 2.60            | 25.0            | 375    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 50       | 0.260           | 3.00            | 9.93   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 50       | 95.0            | 2500            | 70400  | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 09:00  
Analyzed: 27-Oct-2017 15:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/13/2017 09:00  
Analyzed: 30-Oct-2017 18:33

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 200      | 4.40            | 40.0            | 14.8   | ug/L  | J, D  |

Instrument: ICPMS2 Analyzed: 27-Oct-2017 15:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 20       | 7.00            | 10.0            | ND     | ug/L  | U     |
| Nickel, Dissolved | 7440-02-0  | 20       | 1.00            | 10.0            | ND     | ug/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 09:00  
Analyzed: 18-Oct-2017 14:29

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0451 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/13/2017 09:00  
Analyzed: 16-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0436 Sample Size: 5 mL  
Prepared: 16-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>157000</b> | mg/L  |       |





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Reported:  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/13/2017 09:00

Instrument: Accumet AR60

Analyzed: 17-Oct-2017 14:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0471  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1330   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1330   | mg/L CaCO3 |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/13/2017 09:00  
Analyzed: 20-Oct-2017 16:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>65.2</b> | mg/L  |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 09:00  
Analyzed: 14-Oct-2017 20:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|---------------|-------|-------|
| Chloride | 16887-00-6 | 50000    | 5000            | <b>100000</b> | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 09:00  
Analyzed: 14-Oct-2017 20:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1440</b> | mg/L  | D     |



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Reported:  
31-Oct-2017 16:42

**GW-2B2-2-101317-30.8-35.8-(20)**  
**17J0239-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 09:00  
Analyzed: 17-Oct-2017 12:00

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391  
Prepared: 14-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 100      | 10.0            | 33.8   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 100      | 10.0            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 100      | 10.0            | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 100      | 10.0            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 100      | 10.0            | ND     | mg-P/L | H, U  |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14**  
**17J0239-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 10:15  
Analyzed: 16-Oct-2017 15:39

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0418 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.92</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.13</b> | ug/L  | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 103   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 98.0  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 92.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 103   | %     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14**  
**17J0239-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 10:15  
Analyzed: 26-Oct-2017 17:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>0.935</b> | ug/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14**  
**17J0239-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 10:15  
Analyzed: 26-Oct-2017 17:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>87.9</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>6.36</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>4.43</b> | ug/L  | D     |





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**Reported:**  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14**  
**17J0239-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 10:15  
Analyzed: 18-Oct-2017 14:01

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0443 Sample Size: 20 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/13/2017 10:15  
Analyzed: 27-Oct-2017 15:30

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>118</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>9.36</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>57.0</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0781</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>7.14</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>17.8</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>253</b>    | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/13/2017 10:15  
Analyzed: 30-Oct-2017 17:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
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Reported:  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/13/2017 10:15  
Analyzed: 30-Oct-2017 17:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 2        | 0.680           | 1.00            | ND          | ug/L  | U     |
| Nickel, Dissolved | 7440-02-0  | 2        | 0.100           | 1.00            | <b>4.09</b> | ug/L  | D     |

Instrument: ICPMS2 Analyzed: 27-Oct-2017 15:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>90.1</b> | ug/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 10:15  
Analyzed: 18-Oct-2017 14:30

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0451 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/13/2017 10:15  
Analyzed: 16-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0436 Sample Size: 75 mL  
Prepared: 16-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>1210</b> | mg/L  |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 10:15  
Analyzed: 14-Oct-2017 14:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 100      | 10.0            | <b>238</b> | mg/L  | E, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>212</b> | mg/L  | D     |



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Reported:  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/13/2017 10:15  
Analyzed: 17-Oct-2017 14:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0471  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 538    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 538    | mg/L CaCO3 |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/13/2017 10:15  
Analyzed: 20-Oct-2017 17:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>11.9</b> | mg/L  |       |



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Reported:  
31-Oct-2017 16:42

**GW-2A1-1-101317-9-14-(20)**  
**17J0239-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 10:15  
Analyzed: 17-Oct-2017 12:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391  
Prepared: 14-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.316</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.47</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.21</b> | mg-P/L | H     |



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Reported:  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5**  
**17J0239-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 10:30  
Analyzed: 16-Oct-2017 15:59

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0418 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.57</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 102   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101   | %     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5**  
**17J0239-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 10:30  
Analyzed: 23-Oct-2017 21:45

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>14.0</b> | ug/L  | D     |



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Reported:  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5**  
**17J0239-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 10:30  
Analyzed: 23-Oct-2017 21:45

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>208</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>35.6</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>6.70</b> | ug/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5**  
**17J0239-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 10:30  
Analyzed: 18-Oct-2017 14:03

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0443 Sample Size: 20 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/13/2017 10:30  
Analyzed: 27-Oct-2017 15:37

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.257</b>  | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>0.145</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>2.33</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.189</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0255</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>0.978</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>26.3</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>154</b>    | mg/L  |       |



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Project Number: 79227  
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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/13/2017 10:30  
Analyzed: 30-Oct-2017 17:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | <b>2.61</b> | ug/L  | D     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/13/2017 10:30  
Analyzed: 30-Oct-2017 17:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 2        | 0.680           | 1.00            | <b>3.15</b> | ug/L  | D     |
| Nickel, Dissolved | 7440-02-0  | 2        | 0.100           | 1.00            | <b>2.77</b> | ug/L  | D     |

Instrument: ICPMS2 Analyzed: 27-Oct-2017 15:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>223</b> | ug/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 10:30  
Analyzed: 18-Oct-2017 14:32

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0451 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/13/2017 10:30  
Analyzed: 16-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0436 Sample Size: 100 mL  
Prepared: 16-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | 437    | mg/L  |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 10:30  
Analyzed: 14-Oct-2017 14:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | <b>2.87</b> | mg-P/L | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/13/2017 10:30  
Analyzed: 17-Oct-2017 14:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0471  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 232    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 232    | mg/L CaCO3 |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/13/2017 10:30  
Analyzed: 20-Oct-2017 17:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>13.2</b> | mg/L  |       |



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Reported:  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 10:30  
Analyzed: 14-Oct-2017 18:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391  
Prepared: 14-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 2        | 0.200           | <b>0.296</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>0.855</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 2        | 0.200           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 2        | 0.200           | ND     | mg-N/L | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-1-101317-4.5-10.5-(20)**  
**17J0239-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 10:30  
Analyzed: 14-Oct-2017 21:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 20       | 2.00            | <b>39.2</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>31.7</b> | mg/L  | D     |





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Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/13/2017 11:45  
Analyzed: 27-Oct-2017 15:10

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 10       | 0.0850          | 0.500           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 10       | 0.0510          | 0.500           | 351    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 10       | 0.0130          | 0.500           | 44.1   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 10       | 0.160           | 0.500           | 557    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 10       | 0.0034          | 0.0100          | 2.52   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 10       | 0.520           | 5.00            | 362    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 10       | 0.0520          | 0.600           | 17.5   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 10       | 19.0            | 500             | 19700  | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 11:45  
Analyzed: 27-Oct-2017 16:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 11:45  
Analyzed: 27-Oct-2017 16:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>6.34</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 11:45  
Analyzed: 18-Oct-2017 14:34

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0451 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/13/2017 11:45  
Analyzed: 16-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0436 Sample Size: 5 mL  
Prepared: 16-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>44900</b> | mg/L  |       |



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Reported:  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/13/2017 11:45  
Analyzed: 17-Oct-2017 14:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0471  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1200   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1200   | mg/L CaCO3 |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/13/2017 11:45  
Analyzed: 20-Oct-2017 17:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0549 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | <b>40.8</b> | mg/L  |       |



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Reported:  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 11:45  
Analyzed: 17-Oct-2017 12:39

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391  
Prepared: 14-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | 21.2   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 20       | 2.00            | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 20       | 2.00            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | ND     | mg-P/L | H, U  |





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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 11:45  
Analyzed: 17-Oct-2017 13:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1290</b> | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5-(20)**  
**17J0239-09RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 11:45  
Analyzed: 17-Oct-2017 16:00

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 20000    | 2000            | <b>29500</b> | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5**  
**17J0239-10 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 11:45  
Analyzed: 16-Oct-2017 16:20

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0418 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>6.61</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>212</b>      | ug/L          | E     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.51</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.84</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>111 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>101 %</i>  |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>93.6 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>104 %</i>  |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5**  
**17J0239-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 11:45  
Analyzed: 23-Oct-2017 21:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5**  
**17J0239-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 11:45  
Analyzed: 23-Oct-2017 21:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>4.62</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>2.34</b> | ug/L  | J, D  |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5**  
**17J0239-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 11:45  
Analyzed: 18-Oct-2017 14:04

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0443 Sample Size: 20 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-4B2-2-101317-22.5-27.5**  
**17J0239-10RE1 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 11:45  
Analyzed: 17-Oct-2017 14:32

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0448 Sample Size: 0.4 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 1.43            | 5.00            | <b>6.28</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.68            | 5.00            | <b>451</b>      | ug/L          |       |
| Trichloroethene                          | 79-01-6    | 1        | 1.22            | 5.00            | ND              | ug/L          | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 1.19            | 5.00            | <b>1.30</b>     | ug/L          | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>110 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>98.2 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>89.8 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>103 %</i>  |       |



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Reported:  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5**  
**17J0239-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 12:30  
Analyzed: 17-Oct-2017 14:52

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0448 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.06</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.06</b> | ug/L  | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 117   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.3  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 89.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106   | %     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5**  
**17J0239-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 12:30  
Analyzed: 23-Oct-2017 21:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5**  
**17J0239-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 12:30  
Analyzed: 23-Oct-2017 21:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1.92</b> | ug/L  | J, D  |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5**  
**17J0239-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 12:30  
Analyzed: 18-Oct-2017 14:06

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0443 Sample Size: 20 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/13/2017 12:30  
Analyzed: 27-Oct-2017 15:15

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | 444    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | 18.9   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | 997    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | 1.05   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | 452    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | 18.8   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | 12300  | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 12:30  
Analyzed: 27-Oct-2017 16:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 12:30  
Analyzed: 27-Oct-2017 16:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3.82</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 12:30  
Analyzed: 18-Oct-2017 14:35

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0451 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Olympia WA, 98503

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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/13/2017 12:30  
Analyzed: 16-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0436 Sample Size: 5 mL  
Prepared: 16-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>30700</b> | mg/L  |       |





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Reported:  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/13/2017 12:30

Instrument: Accumet AR60

Analyzed: 17-Oct-2017 14:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0471  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1690   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1690   | mg/L CaCO3 |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/13/2017 12:30  
Analyzed: 20-Oct-2017 20:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>22.9</b> | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 12:30  
Analyzed: 17-Oct-2017 12:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391  
Prepared: 14-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>21.8</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 20       | 2.00            | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 20       | 2.00            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | ND     | mg-P/L | H, U  |



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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 12:30  
Analyzed: 17-Oct-2017 14:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | 479    | mg/L  | D     |



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Project Number: 79227  
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**Reported:**  
31-Oct-2017 16:42

**GW-4B3-2-101317-17.5-27.5-(20)**  
**17J0239-12RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 12:30  
Analyzed: 17-Oct-2017 16:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>19800</b> | mg/L  | D     |



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Reported:  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5**  
**17J0239-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 13:30  
Analyzed: 16-Oct-2017 17:01

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0418 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.05</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 109 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.5 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 92.8 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 105 %  |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5**  
**17J0239-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 13:30  
Analyzed: 23-Oct-2017 21:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5**  
**17J0239-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 13:30  
Analyzed: 23-Oct-2017 21:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>4.10</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5**  
**17J0239-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 13:30  
Analyzed: 18-Oct-2017 14:11

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0443 Sample Size: 20 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/13/2017 13:30  
Analyzed: 27-Oct-2017 15:19

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | 179    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | 29.7   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | 389    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | 2.58   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | 266    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | 25.4   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | 5060   | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 13:30  
Analyzed: 27-Oct-2017 16:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 13:30  
Analyzed: 27-Oct-2017 16:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | 2.42   | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND     | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND     | ug/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 13:30  
Analyzed: 18-Oct-2017 14:37

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0451  
Prepared: 17-Oct-2017

Sample Size: 10 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/13/2017 13:30  
Analyzed: 16-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0436 Sample Size: 5 mL  
Prepared: 16-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>11700</b> | mg/L  |       |



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Reported:  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/13/2017 13:30  
Analyzed: 17-Oct-2017 14:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0471  
Prepared: 17-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1190</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1190</b> | mg/L CaCO3 |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/13/2017 13:30  
Analyzed: 20-Oct-2017 21:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>25.4</b> | mg/L  | D     |





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Reported:  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 13:30  
Analyzed: 17-Oct-2017 13:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391  
Prepared: 14-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | 12.8   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | ND     | mg-P/L | H, U  |



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**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 13:30  
Analyzed: 17-Oct-2017 14:38

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>133</b> | mg/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-3E1-2-101317-17.5-22.5-(20)**  
**17J0239-14RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 13:30  
Analyzed: 25-Oct-2017 20:00

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>7670</b> | mg/L  | D     |



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Reported:  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5**  
**17J0239-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 13:45  
Analyzed: 16-Oct-2017 17:21

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0418 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>4.71</b> | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 110   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.7  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 91.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 105   | %     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5**  
**17J0239-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/13/2017 13:45  
Analyzed: 26-Oct-2017 17:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>0.540</b> | ug/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5**  
**17J0239-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/13/2017 13:45  
Analyzed: 26-Oct-2017 17:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0490 Sample Size: 25 mL  
Prepared: 18-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>35.3</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>11.0</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>11.8</b> | ug/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5**  
**17J0239-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 13:45  
Analyzed: 18-Oct-2017 14:13

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0443  
Prepared: 17-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/13/2017 13:45  
Analyzed: 27-Oct-2017 12:19

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580 Sample Size: 25 mL  
Prepared: 20-Oct-2017 Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.462</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>9.60</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>11.4</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>3.80</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.196</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>8.24</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>30.6</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | <b>38.8</b>  | mg/L  |       |





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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/13/2017 13:45  
Analyzed: 30-Oct-2017 17:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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Reported:  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/13/2017 13:45  
Analyzed: 30-Oct-2017 17:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 2        | 0.680           | 1.00            | <b>1.46</b> | ug/L  | D     |
| Nickel, Dissolved | 7440-02-0  | 2        | 0.100           | 1.00            | <b>8.82</b> | ug/L  | D     |

Instrument: ICPMS2

Analyzed: 27-Oct-2017 16:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>34.1</b> | ug/L  | D     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/13/2017 13:45  
Analyzed: 18-Oct-2017 14:38

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0451 Sample Size: 10 mL  
Prepared: 17-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/13/2017 13:45  
Analyzed: 16-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0436 Sample Size: 200 mL  
Prepared: 16-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 5.0             | <b>221</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 13:45  
Analyzed: 14-Oct-2017 16:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 0.20            | <b>0.73</b> | mg-P/L | D     |



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Reported:  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/13/2017 13:45  
Analyzed: 17-Oct-2017 14:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0471  
Prepared: 17-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>105</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>105</b> | mg/L CaCO3 |       |



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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/13/2017 13:45  
Analyzed: 20-Oct-2017 21:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>8.98</b> | mg/L  | D     |



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Reported:  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 13:45  
Analyzed: 17-Oct-2017 13:38

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391  
Prepared: 14-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.140</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.32</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | H, U  |





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**Reported:**  
31-Oct-2017 16:42

**GW-4F1-1-101317-4.5-9.5-(20)**  
**17J0239-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/13/2017 13:45  
Analyzed: 17-Oct-2017 14:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0391 Sample Size: 5 mL  
Prepared: 14-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 10       | 1.00            | <b>19.0</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>13.7</b> | mg/L  | D     |



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Reported:  
31-Oct-2017 16:42

**Trip Blank**  
**17J0239-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/13/2017 00:00  
Analyzed: 16-Oct-2017 13:51

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0418 Sample Size: 10 mL  
Prepared: 16-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 101   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 94.0  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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Reported:  
31-Oct-2017 16:42

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0418 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0418-BLK2)</b>              |        |                 |                 |       |             |   |      |             |       |           |       |
|  |        |                 |                 |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 12:50 |      |             |       |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |       |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |       |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |       |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |       |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.13            |                 | ug/L  | 5.00        |   | 103  | 80-129      |       |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.80            |                 | ug/L  | 5.00        |   | 96.0 | 80-120      |       |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.67            |                 | ug/L  | 5.00        |   | 93.4 | 80-120      |       |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.16            |                 | ug/L  | 5.00        |   | 103  | 80-120      |       |           |       |
| <b>LCS (BFJ0418-BS2)</b>                 |        |                 |                 |       |             |   |      |             |       |           |       |
|  |        |                 |                 |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 11:42 |      |             |       |           |       |
| Vinyl Chloride                           | 10.3   | 0.06            | 0.20            | ug/L  | 10.0        |   | 103  | 66-133      |       |           |       |
| Chloroform                               | 9.56   | 0.03            | 0.20            | ug/L  | 10.0        |   | 95.6 | 80-122      |       |           |       |
| Trichloroethene                          | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      |       |           |       |
| Tetrachloroethene                        | 9.96   | 0.05            | 0.20            | ug/L  | 10.0        |   | 99.6 | 80-120      |       |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.14            |                 | ug/L  | 5.00        |   | 103  | 80-120      |       |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.79            |                 | ug/L  | 5.00        |   | 95.8 | 80-129      |       |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.00            |                 | ug/L  | 5.00        |   | 99.9 | 80-120      |       |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.98            |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |       |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.04            |                 | ug/L  | 5.00        |   | 101  | 80-120      |       |           |       |
| <b>LCS Dup (BFJ0418-BSD2)</b>            |        |                 |                 |       |             |   |      |             |       |           |       |
|  |        |                 |                 |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 12:03 |      |             |       |           |       |
| Vinyl Chloride                           | 10.6   | 0.06            | 0.20            | ug/L  | 10.0        |   | 106  | 66-133      | 2.77  | 30        |       |
| Chloroform                               | 9.69   | 0.03            | 0.20            | ug/L  | 10.0        |   | 96.9 | 80-122      | 1.39  | 30        |       |
| Trichloroethene                          | 10.4   | 0.05            | 0.20            | ug/L  | 10.0        |   | 104  | 80-120      | 2.78  | 30        |       |
| Tetrachloroethene                        | 11.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 111  | 80-120      | 11.10 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.09            |                 | ug/L  | 5.00        |   | 102  | 80-120      |       |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.90            |                 | ug/L  | 5.00        |   | 97.9 | 80-129      |       |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.99            |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |       |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.21            |                 | ug/L  | 5.00        |   | 104  | 80-120      |       |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.75            |                 | ug/L  | 5.00        |   | 95.0 | 80-120      |       |           |       |



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Reported:  
31-Oct-2017 16:42

### Volatile Organic Compounds - Quality Control

#### Batch BFJ0448 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0448-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 11:47 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.92            |                 | ug/L  | 5.00        |   | 98.4 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.76            |                 | ug/L  | 5.00        |   | 95.2 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.71            |                 | ug/L  | 5.00        |   | 94.3 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.11            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFJ0448-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 10:24 |      |             |      |           |       |
| Vinyl Chloride                           | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      |      |           |       |
| Chloroform                               | 9.53   | 0.03            | 0.20            | ug/L  | 10.0        |   | 95.3 | 80-122      |      |           |       |
| Trichloroethene                          | 11.0   | 0.05            | 0.20            | ug/L  | 10.0        |   | 110  | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |   | 103  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.04            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.56            |                 | ug/L  | 5.00        |   | 91.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.10            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.03            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0448-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 10:44 |      |             |      |           |       |
| Vinyl Chloride                           | 11.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 111  | 66-133      | 9.18 | 30        |       |
| Chloroform                               | 10.2   | 0.03            | 0.20            | ug/L  | 10.0        |   | 102  | 80-122      | 6.30 | 30        |       |
| Trichloroethene                          | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      | 4.69 | 30        |       |
| Tetrachloroethene                        | 10.4   | 0.05            | 0.20            | ug/L  | 10.0        |   | 104  | 80-120      | 0.86 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.42            |                 | ug/L  | 5.00        |   | 108  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.88            |                 | ug/L  | 5.00        |   | 97.6 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.98            |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.10            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
31-Oct-2017 16:42

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0443 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0443-BLK1)</b> |         |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 18-Oct-2017 13:39 |      |             |     |           |       |
| Mercury                     | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0443-BS1)</b>    |         |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 18-Oct-2017 15:02 |      |             |     |           |       |
| Mercury                     | 0.00232 | 0.000100        | mg/L  | 0.00200     |   | 116  | 80-120      |     |           |       |



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Reported:  
31-Oct-2017 16:42

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0490 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0490-BLK1)</b> |         |        |                 |                 |       | Prepared: 18-Oct-2017 Analyzed: 20-Oct-2017 13:27 |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFJ0490-BS1)</b>    |         |        |                 |                 |       | Prepared: 18-Oct-2017 Analyzed: 20-Oct-2017 14:11 |               |      |             |     |           |       |
| Lead                        | 208     | 28.0   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 112  | 80-120      |     |           |       |
| Arsenic                     | 75a     | 25.7   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 103  | 80-120      |     |           |       |
| Copper                      | 63      | 27.1   | 0.340           | 0.500           | ug/L  | 25.0  |               | 108  | 80-120      |     |           |       |
| Copper                      | 65      | 26.8   | 0.350           | 0.500           | ug/L  | 25.0  |               | 107  | 80-120      |     |           |       |
| Nickel                      | 60      | 26.7   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 107  | 80-120      |     |           |       |
| Nickel                      | 62      | 26.6   | 0.220           | 0.500           | ug/L  | 25.0  |               | 106  | 80-120      |     |           |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0451 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0451-BLK1)</b> |         |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 18-Oct-2017 14:15 |      |             |     |           |       |
| Mercury, Dissolved          | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0451-BS1)</b>    |         |                 |       |             | Prepared: 17-Oct-2017 Analyzed: 18-Oct-2017 14:16 |      |             |     |           |       |
| Mercury, Dissolved          | 0.00233 | 0.000100        | mg/L  | 0.00200     |   | 117  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0580 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0580-BLK1)</b> |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 20:57 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0178 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0308 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFJ0580-BS1)</b> |       |        |        |      |       |   |      |        |  |  |   |
|                          |       |        |        |      |       | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 21:16 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.12  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 106  | 80-120 |  |  |   |
| Calcium, Dissolved       | 10.3  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 103  | 80-120 |  |  |   |
| Iron, Dissolved          | 2.23  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 112  | 80-120 |  |  |   |
| Magnesium, Dissolved     | 11.4  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 114  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.548 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 110  | 80-120 |  |  |   |
| Potassium, Dissolved     | 9.41  | 0.0520 | 0.500  | mg/L | 10.0  |   | 94.1 | 80-120 |  |  |   |
| Silicon, Dissolved       | 11.3  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 113  | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.67  | 0.0114 | 0.500  | mg/L | 10.0  |   | 96.7 | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.3  | 1.90   | 50.0   | mg/L | 10.0  |   | 103  | 80-120 |  |  | J |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0732 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0732-BLK2)</b> |         |        |                 |                 |       |   |               |      |             |     |           |       |
|                             |         |        |                 |                 |       | Prepared: 25-Oct-2017 Analyzed: 30-Oct-2017 17:17 |               |      |             |     |           |       |
| Arsenic, Dissolved          | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |

|                          |     |      |        |       |      |   |  |      |        |  |  |  |
|--------------------------|-----|------|--------|-------|------|---|--|------|--------|--|--|--|
| <b>LCS (BFJ0732-BS2)</b> |     |      |        |       |      |   |  |      |        |  |  |  |
|                          |     |      |        |       |      | Prepared: 25-Oct-2017 Analyzed: 30-Oct-2017 17:21 |  |      |        |  |  |  |
| Arsenic, Dissolved       | 75a | 24.2 | 0.0220 | 0.200 | ug/L | 25.0  |  | 96.9 | 80-120 |  |  |  |

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0732-BLK1)</b> |         |        |                 |                 |       |   |               |      |             |     |           |       |
|                             |         |        |                 |                 |       | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 13:52 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |

|                          |     |      |        |       |      |   |  |     |        |  |  |  |
|--------------------------|-----|------|--------|-------|------|---|--|-----|--------|--|--|--|
| <b>LCS (BFJ0732-BS1)</b> |     |      |        |       |      |   |  |     |        |  |  |  |
|                          |     |      |        |       |      | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 14:33 |  |     |        |  |  |  |
| Lead, Dissolved          | 208 | 26.8 | 0.0680 | 0.100 | ug/L | 25.0  |  | 107 | 80-120 |  |  |  |
| Copper, Dissolved        | 63  | 25.6 | 0.340  | 0.500 | ug/L | 25.0  |  | 102 | 80-120 |  |  |  |
| Copper, Dissolved        | 65  | 26.2 | 0.350  | 0.500 | ug/L | 25.0  |  | 105 | 80-120 |  |  |  |
| Nickel, Dissolved        | 60  | 25.1 | 0.0500 | 0.500 | ug/L | 25.0  |  | 101 | 80-120 |  |  |  |
| Nickel, Dissolved        | 62  | 25.2 | 0.220  | 0.500 | ug/L | 25.0  |  | 101 | 80-120 |  |  |  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

Wet Chemistry - Quality Control

Batch BFJ0391 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0391-BLK1)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Prepared: 14-Oct-2017 Analyzed: 14-Oct-2017 12:22                       |        |                 |        |             |               |      |             |       |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |       |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |       |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |       |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |       |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |       |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |       |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |       |           | U     |
| <b>LCS (BFJ0391-BS1)</b>  |        |                 |        |             |               |      |             |       |           |       |
| Prepared: 14-Oct-2017 Analyzed: 14-Oct-2017 12:42                       |        |                 |        |             |               |      |             |       |           |       |
| Bromide   | 1.48   | 0.100           | mg/L   | 1.50        |               | 98.7 | 75-125      |       |           |       |
| Chloride  | 1.47   | 0.100           | mg/L   | 1.50        |               | 97.9 | 75-125      |       |           |       |
| Fluoride  | 1.50   | 0.100           | mg/L   | 1.50        |               | 100  | 75-125      |       |           |       |
| Nitrate-N   | 1.52   | 0.100           | mg-N/L | 1.50        |               | 101  | 75-125      |       |           |       |
| Nitrite-N   | 1.51   | 0.100           | mg-N/L | 1.50        |               | 101  | 75-125      |       |           |       |
| Orthophosphorus   | 1.49   | 0.10            | mg-P/L | 1.50        |               | 99.2 | 75-125      |       |           |       |
| Sulfate   | 1.50   | 0.100           | mg/L   | 1.50        |               | 99.9 | 75-125      |       |           |       |
| <b>Duplicate (BFJ0391-DUP2)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0239-02RE1 Prepared: 14-Oct-2017 Analyzed: 14-Oct-2017 17:25 |        |                 |        |             |               |      |             |       |           |       |
| Bromide   | 4.05   | 2.00            | mg/L   |             | 3.95          |      |             | 2.43  | 20        | D     |
| Fluoride  | ND     | 2.00            | mg/L   |             | ND            |      |             |       |           | U     |
| Nitrate-N   | ND     | 2.00            | mg-N/L |             | ND            |      |             |       |           | U     |
| Nitrite-N   | ND     | 2.00            | mg-N/L |             | ND            |      |             |       |           | U     |
| Orthophosphorus   | 6.35   | 2.00            | mg-P/L |             | 6.11          |      |             | 3.82  | 20        | D     |
| Sulfate   | 6.38   | 2.00            | mg/L   |             | 6.21          |      |             | 2.59  | 20        | D     |
| <b>Duplicate (BFJ0391-DUP5)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0239-02RE3 Prepared: 14-Oct-2017 Analyzed: 22-Oct-2017 07:55 |        |                 |        |             |               |      |             |       |           |       |
| Chloride  | 5230   | 500             | mg/L   |             | 5270          |      |             | 0.90  | 20        | D     |
| <b>Duplicate (BFJ0391-DUP6)</b>   |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0239-02RE3 Prepared: 14-Oct-2017 Analyzed: 22-Oct-2017 08:15 |        |                 |        |             |               |      |             |       |           |       |
| Chloride  | 6000   | 500             | mg/L   |             | 5270          |      |             | 12.90 | 20        | D     |
| <b>Matrix Spike (BFJ0391-MS2)</b>                                       |        |                 |        |             |               |      |             |       |           |       |
| Source: 17J0239-02RE1 Prepared: 14-Oct-2017 Analyzed: 14-Oct-2017 17:45 |        |                 |        |             |               |      |             |       |           |       |
| Bromide   | 22.8   | 2.00            | mg/L   | 20.0        | 3.95          | 94.3 | 75-125      |       |           | D     |
| Fluoride  | 21.9   | 2.00            | mg/L   | 20.0        | ND            | 109  | 75-125      |       |           | D     |
| Nitrate-N   | 20.7   | 2.00            | mg-N/L | 20.0        | ND            | 104  | 75-125      |       |           | D     |
| Nitrite-N   | 20.1   | 2.00            | mg-N/L | 20.0        | ND            | 100  | 75-125      |       |           | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**Wet Chemistry - Quality Control**

**Batch BFJ0391 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit              | Units  | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|------------------------------|--------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0391-MS2)</b> |        |                              |        |                       |               |                             |             |     |           |       |
|                                   |        | <b>Source: 17J0239-02RE1</b> |        | Prepared: 14-Oct-2017 |               | Analyzed: 14-Oct-2017 17:45 |             |     |           |       |
| Orthophosphorus                   | 25.5   | 2.00                         | mg-P/L | 20.0                  | 6.11          | 96.8                        | 75-125      |     |           | D     |
| Sulfate                           | 25.6   | 2.00                         | mg/L   | 20.0                  | 6.21          | 96.9                        | 75-125      |     |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**Wet Chemistry - Quality Control**

**Batch BFJ0436 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0436-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 18:24 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0436-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 18:24 |      |             |      |           |       |
| Dissolved Solids                | 495    | 5.0                       | mg/L  | 500         |   | 99.0 | 90-110      |      |           |       |
| <b>Duplicate (BFJ0436-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17J0239-02</b> |       |             | Prepared: 16-Oct-2017 Analyzed: 16-Oct-2017 18:24 |      |             |      |           |       |
| Dissolved Solids                | 9260   | 200                       | mg/L  |             | 8760  |      |             | 5.55 | 20        |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**Wet Chemistry - Quality Control**

**Batch BFJ0471 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit  | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|---------------------------------|--------|--|------------|-------------|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0471-BLK1)</b>     |        | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 14:20                    |            |             |               |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00   | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Duplicate (BFJ0471-DUP1)</b> |        | Source: 17J0239-02 Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 14:20 |            |             |               |      |              |      |           |       |
| Alkalinity, Total               | 798    | 1.00   | mg/L CaCO3 |             | 804           |      |              | 0.74 | 20        |       |
| <b>Reference (BFJ0471-SRM1)</b> |        | Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 14:20                    |            |             |               |      |              |      |           |       |
| Alkalinity, Total               | 104    | 1.00   | mg/L CaCO3 | 108         |               | 96.1 | 90.37-108.33 |      |           |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**Wet Chemistry - Quality Control**

**Batch BFJ0549 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: GM

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0549-BLK1)</b>         |        |                 |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 07:32 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0549-BS1)</b>            |        |                 |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 07:50 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 20.1   | 0.50            | mg/L  | 20.0        |   | 101  | 90-110      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

Wet Chemistry - Quality Control

Batch BFJ0554 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: GM

| QC Sample/Analyte                   | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-------------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0554-BLK1)</b>         |        |                           |       |             |   |      |             |      |           |       |
|                                     |        |                           |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 19:27 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50                      | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0554-BS1)</b>            |        |                           |       |             |   |      |             |      |           |       |
|                                     |        |                           |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 19:50 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 20.5   | 0.50                      | mg/L  | 20.0        |   | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0554-DUP1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                     |        | <b>Source: 17J0239-12</b> |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 20:32 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 22.8   | 1.00                      | mg/L  |             | 22.9  |      |             | 0.44 | 20        | D     |
| <b>Matrix Spike (BFJ0554-MS1)</b>   |        |                           |       |             |   |      |             |      |           |       |
|                                     |        | <b>Source: 17J0239-12</b> |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 20:54 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 42.9   | 1.00                      | mg/L  | 20.0        | 22.9  | 100  | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**Wet Chemistry - Quality Control**

**Batch BFJ0733 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>Blank (BFJ0733-BLK1)</b> |        |                 |       |             |               | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:25 |             |     |           |       |
| Chloride                    | ND     | 0.100           | mg/L  |             |               |   |             |     |           | U     |
| <b>LCS (BFJ0733-BS1)</b>    |        |                 |       |             |               | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:45 |             |     |           |       |
| Chloride                    | 1.50   | 0.100           | mg/L  | 1.50        |               | 99.9  | 90-110      |     |           |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

### Certified Analyses included in this Report

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
31-Oct-2017 16:42

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
31-Oct-2017 16:42

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
31-Oct-2017 16:42

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



05 December 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0283

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: 10/16/17  
 Page: 1 of 3  
 No. of Coolers: \_\_\_\_\_  
 Cooler Temps: \_\_\_\_\_

Turn-around Requested: Normal  
 Phone: 360-570-1700  
 Pioneer Technologies  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227

| Sample ID                       | Date   | Time | Matrix | No. Containers | Analysis Requested                          |  |  |  |   |  |                                      |                               | Notes/Comments           |               |  |              |
|---------------------------------|--|------|--------|----------------|---|--|--|--|---|--|--------------------------------------|-------------------------------|--------------------------|---------------|--|--------------|
|                                 |  |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Cr, Ni<br><del>EPA 8210C</del> | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B    |                          |               |  |              |
| GW-3A3-1R-101617-8.2-13.2       | 10/16/17   | 1015 | Water  | 3              |   | X  |  |  |   |  |                                      |                               |                          |               | Dissolved Samples Field Filtered 0.45 um |              |
| GW-3A3-1R-101617-8.2-13.2-(20)  |  | 1015 |        | 4              |   | X  |  | X  |   |  |                                      | X                             |                          |               |  |              |
| GW-3A2-2R-101617-22.3-21.3      |  | 1025 |        | 3              |   | X  |  |  | X   |  |                                      |                               |                          |               |  |              |
| GW-3A2-2R-101617-22.3-21.3-(20) |  | 1025 |        | 4              |   | X  |  | X  |   |  |                                      | X                             |                          |               |  |              |
| GW-3A7-1R-101617                |  | 1145 |        | 3              |   | X  |  |  | X   |  |                                      |                               |                          |               |  |              |
| GW-3A7-1R-101617-(20)           |  | 1145 |        | 4              |   | X  |  | X  |   |  |                                      | X                             |                          |               |  |              |
| GW-3A6-2R-101617                |  | 1200 |        | 3              |   | X  |  |  | X   |  |                                      |                               |                          |               |  |              |
| GW-3A6-2R-101617-(20)           |  | 1200 |        | 4              |   | X  |  |  | X   |  |                                      | X                             |                          |               |  |              |
| GW-4B4-1-101617                 |  | 1400 |        | 3              |   | X  |  |  |   |  |                                      |                               |                          |               |  |              |
| GW-4B4-1-101617-(20)            |  | 1400 |        | 4              |   | X  |  |  |   |  |                                      | X                             |                          |               |  |              |
| GW-4B4-2-101617                 |  | 1330 |        | 3              |   | X  |  |  |   |  |                                      |                               |                          |               |  |              |
| Comments/Special Instructions   | Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 |      |        |                | Received by: (Signature)<br>Ted Dreher      | Printed Name:<br>Ted Dreher                        | Company:<br>DOF                                      | Date & Time:<br>10/17/17 1400                                      | Relinquished by: (Signature)<br>Jacob Walker  | Printed Name:<br>Jacob Walker                                    | Company:<br>ARI                      | Date & Time:<br>10/17/17 1405 | Received by: (Signature) | Printed Name: | Company:                                 | Date & Time: |

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17J0283**  
 Turn-around Requested: **Normal**  
 ARI Client Company: **Pioneer Technologies**  
 Phone: **360-570-1700**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **DG Cooper 206-660-3466**

Date: **10/16/17**  
 Page: **2** of **3**  
 No. of Coolers: **2**  
 Cooler Temps: **3**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID                   | Date     | Time | Matrix | No. Containers | Analysis Requested                       |  |  |   |  |  |                                   |                         | Notes/Comments                           |
|-----------------------------|----------|------|--------|----------------|--|--|--|---|--|--|-----------------------------------|-------------------------|--|
|                             |          |      |        |                | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B |  |
| GW-4B4-2-101617-(20)        | 10/16/17 | 1330 | Water  | 4              | X  | X  | X  | X   | X  | X  | X                                 | X                       | Dissolved Samples Field Filtered 0.45 um |
| GW-4B4-2-101617-(01)        | 1335     |      |        | 3              |  | X  |  |   |  |  |                                   |                         |  |
| GW-4B4-2-101617-(20)        | 1335     |      |        | 4              |  | X  |  |   |  |  |                                   |                         |  |
| GW-5B1-1R-101617            | 1515     |      |        | 3              |  | X  |  |   |  |  |                                   |                         |  |
| GW-5B1-1R-101617-(20)       | 1515     |      |        | 4              |  | X  |  |   |  |  |                                   |                         | TDS bottle leaked overnight              |
| GW-5B1-2R-101617            | 1530     |      |        | 3              |  | X  |  |   |  |  |                                   |                         |  |
| GW-5B1-2R-101617-(20)       | 1530     |      |        | 4              |  | X  |  |   |  |  |                                   |                         |  |
| GW-5C16-1R-101717           | 10/17/17 | 945  |        | 4              | X  |  |  |   |  |  |                                   |                         |  |
| GW-5C16-1R-101717-(20)      | 945      |      |        | 5              | X  |  |  |   |  |  |                                   |                         |  |
| GW-5C16-1R-101717-(01)      | 950      |      |        | 4              | X  |  |  |   |  |  |                                   |                         |  |
| GW-5C16-1R-101717-(01)-(20) | 950      |      |        | 4              | X  |  |  |   |  |  |                                   |                         | Combined All samples in bottle           |

Relinquished by: **[Signature]** Printed Name: **Tenzel Dreher** Company: **DOF** Date & Time: **10/17/17 1400**  
 Received by: **[Signature]** Printed Name: **Jacob Walker** Company: **ARI** Date & Time: **10/17/17 1405**

Comments/Special Instructions: **submit EDD to PIONEER using PIONEER EDD format fill to Port of Tacoma 'O#79227**

imits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

ample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17J0283**  
 Turn-around Requested: **Normal**  
 ARI Client Company: **Pioneer Technologies**  
 Phone: **360-570-1700**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**

Date: **10/17/17**  
 Page: **3** of **3**  
 No. of Coolers: **3**  
 Cooler Temps: **0.45 mm**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

| Sample ID              | Date     | Time | Matrix | No. Containers | Analysis Requested                          |  |  |   |   |  |                                      |                            | Notes/Comments                            |
|------------------------|----------|------|--------|----------------|---|--|--|---|---|--|--------------------------------------|----------------------------|---|
|                        |          |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |   |
| GW-5010-2E-101717      | 10/17/17 | 955  | Water  | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | Dissolved Samples Field Filtered 0.45 mm  |
| GW-5010-2R-101717-(20) |          | 955  |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined                |
| GW-5010-2-101717       |          | 1100 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined                |
| GW-5010-2-101717-(20)  |          | 1100 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined                |
| GW-5010-2-101717       |          | 1115 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined                |
| GW-5010-2-101717-(20)  |          | 1115 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined                |
| GW-401-1-101717-(20)   |          | 1230 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined                |
| GW-5010-2-101717       |          | 1230 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined                |
| GW-5010-2-101717-(20)  |          | 1235 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined                |
| GW-5010-2-101717-(20)  |          | 1235 |        | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | anions/alkalinity combined in same bottle |

Relinquished by: **Sealhard** (Signature)  
 Printed Name: **Sealhard**  
 Company: **ART**  
 Date & Time: **10/17/17 1400**

Received by: **Jacob Walter** (Signature)  
 Printed Name: **Jacob Walter**  
 Company: **ART**  
 Date & Time: **10/17/17 1405**

Comments/Special Instructions: **submit EDD to PIONEER using PIONEER EDD format ill to Port of Tacoma O#79227**

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by a client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Cooler Receipt Form

ARI Client: Pioneer Technologies  
 COC No(s): \_\_\_\_\_ NA  
 Assigned ARI Job No: 17J0283  
 Preliminary Examination Phase: \_\_\_\_\_

Project Name: Arkema FS DG Inv  
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_ NA

Were intact, properly signed and dated custody seals attached to the outside of to cooler?  YES NO  
 Were custody papers included with the cooler?  YES NO  
 Were custody papers properly filled out (ink, signed, etc.)  YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
 Time: 1647 4.3 8.6 9.2  
 If cooler temperature is out of compliance fill out form 00070F  
 1 2 3 Temp Gun ID#: 1005206

Cooler Accepted by: JBW Date: 10/17/17 Time: 1405  
 Complete custody forms and attach all shipping documents

### Log-In Phase:

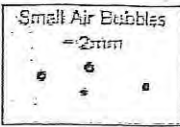
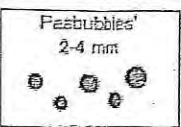
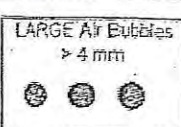
Was a temperature blank included in the cooler? YES  NO  
 What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? NA YES  NO  
 Were all bottles sealed in individual plastic bags? YES  NO  
 Did all bottles arrive in good condition (unbroken)? YES  NO  
 Were all bottle labels complete and legible? YES  NO  
 Did the number of containers listed on COC match with the number of containers received? YES  NO  
 Did all bottle labels and tags agree with custody papers? YES  NO  
 Were all bottles used correct for the requested analyses? YES  NO  
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO  
 Were all VOC vials free of air bubbles? NA YES  NO  
 Was sufficient amount of sample sent in each bottle? YES  NO  
 Date VOC Trip Blank was made at ARI: NA 10/6/17  
 Was Sample Split by ARI:  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: BF Date: 10/18/17 Time: 17:27  
 \*\* Notify Project Manager of discrepancies or concerns \*\*

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

Additional Notes, Discrepancies, & Resolutions:  
Coolers labeled with post-it notes covered with packing tape. Ice was left in giant bags so sufficient temperatures not reached in cooler # 2 & 3.

By: JBW Date: 10/17/17

|   |   |   |                                |
|---|---|---|--------------------------------|
|  |  |  | Small → "sm" (<2 mm)           |
|   |   |   | Peabubbles → "pb" (2 to <4 mm) |
|   |   |   | Large → "lg" (4 to <6 mm)      |
|   |   |   | Headspace → "hs" (>6 mm)       |



# Cooler Temperature Compliance Form

Cooler#: 2 Temperature(°C): 8.6°C

| Sample ID            | Bottle Count | Bottle Type |
|----------------------|--------------|-------------|
| Cooler was above 6°C |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |

Cooler#: 3 Temperature(°C): 9.2°C

| Sample ID            | Bottle Count | Bottle Type |
|----------------------|--------------|-------------|
| Cooler was above 6°C |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |
|                      |              |             |

Cooler#: \_\_\_\_\_ Temperature(°C): \_\_\_\_\_

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |

Cooler#: \_\_\_\_\_ Temperature(°C): \_\_\_\_\_

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
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|           |              |             |
|           |              |             |

Completed by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_





WORK ORDER

17J0283

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                    | pH      |
|--------------|-----------------------------------|---------|
| 17J0283-01 A | Small OJ, 500 mL                  |         |
| 17J0283-01 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass |
| 17J0283-01 C | Small OJ, 500 mL                  |         |
| 17J0283-01 D | Large OJ, 1000 mL                 |         |
| 17J0283-02 A | Small OJ, 500 mL                  |         |
| 17J0283-02 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass |
| 17J0283-02 C | Small OJ, 500 mL                  |         |
| 17J0283-02 D | Large OJ, 1000 mL                 |         |
| 17J0283-03 A | Small OJ, 500 mL                  |         |
| 17J0283-03 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass |
| 17J0283-03 C | Small OJ, 500 mL                  |         |
| 17J0283-03 D | Large OJ, 1000 mL                 |         |
| 17J0283-04 A | Small OJ, 500 mL                  |         |
| 17J0283-04 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass |
| 17J0283-04 C | Small OJ, 500 mL                  |         |
| 17J0283-04 D | Large OJ, 1000 mL                 |         |
| 17J0283-05 A | Small OJ, 500 mL                  |         |
| 17J0283-05 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass |
| 17J0283-05 C | Small OJ, 500 mL                  |         |
| 17J0283-05 D | Large OJ, 1000 mL                 |         |
| 17J0283-06 A | Small OJ, 500 mL                  |         |
| 17J0283-06 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass |
| 17J0283-06 C | Small OJ, 500 mL                  |         |
| 17J0283-06 D | Large OJ, 1000 mL                 |         |
| 17J0283-07 A | Small OJ, 500 mL                  |         |
| 17J0283-07 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass |
| 17J0283-07 C | Small OJ, 500 mL                  |         |
| 17J0283-07 D | Large OJ, 1000 mL                 |         |
| 17J0283-08 A | Small OJ, 500 mL                  |         |
| 17J0283-08 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass |
| 17J0283-08 C | Small OJ, 500 mL                  |         |



WORK ORDER

17J0283

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |

|              |                                   |         |
|--------------|-----------------------------------|---------|
| 17J0283-08 D | Large OJ, 1000 mL                 |         |
| 17J0283-09 A | Small OJ, 500 mL                  |         |
| 17J0283-09 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0283-09 C | Small OJ, 500 mL                  |         |
| 17J0283-09 D | Large OJ, 1000 mL                 |         |
| 17J0283-10 A | Small OJ, 500 mL                  |         |
| 17J0283-11 A | Small OJ, 500 mL                  |         |
| 17J0283-11 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0283-11 C | Small OJ, 500 mL                  |         |
| 17J0283-11 D | Large OJ, 1000 mL                 |         |
| 17J0283-11 E | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0283-12 A | Small OJ, 500 mL                  |         |
| 17J0283-12 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0283-12 C | Large OJ, 1000 mL                 |         |
| 17J0283-12 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0283-13 A | Small OJ, 500 mL                  |         |
| 17J0283-13 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0283-13 C | Small OJ, 500 mL                  |         |
| 17J0283-13 D | Large OJ, 1000 mL                 |         |
| 17J0283-13 E | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0283-14 A | Small OJ, 500 mL                  |         |
| 17J0283-14 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0283-14 C | Large OJ, 1000 mL                 |         |
| 17J0283-14 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0283-15 A | Small OJ, 500 mL                  |         |
| 17J0283-15 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0283-15 C | Large OJ, 1000 mL                 |         |
| 17J0283-15 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0283-16 A | Small OJ, 500 mL                  |         |
| 17J0283-16 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0283-16 C | Large OJ, 1000 mL                 |         |
| 17J0283-16 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0283-17 A | Small OJ, 500 mL                  |         |
| 17J0283-17 B | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |





WORK ORDER

17J0283

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |

|              |   |
|--------------|---|
| 17J0283-17 C | Large OJ, 1000 mL                                 |
| 17J0283-17 D | HDPE NM, 500 mL, 1:1 HNO3 (FF) <i>&lt; 2 pass</i> |
| 17J0283-18 A | VOA Vial, Clear, 40 mL                            |
| 17J0283-18 B | VOA Vial, Clear, 40 mL                            |
| 17J0283-18 C | VOA Vial, Clear, 40 mL                            |
| 17J0283-19 A | VOA Vial, Clear, 40 mL                            |
| 17J0283-19 B | VOA Vial, Clear, 40 mL                            |
| 17J0283-19 C | VOA Vial, Clear, 40 mL                            |
| 17J0283-20 A | VOA Vial, Clear, 40 mL                            |
| 17J0283-20 B | VOA Vial, Clear, 40 mL                            |
| 17J0283-20 C | VOA Vial, Clear, 40 mL                            |
| 17J0283-21 A | VOA Vial, Clear, 40 mL                            |
| 17J0283-21 B | VOA Vial, Clear, 40 mL                            |
| 17J0283-21 C | VOA Vial, Clear, 40 mL                            |
| 17J0283-22 A | VOA Vial, Amber, 40 mL                            |
| 17J0283-22 B | VOA Vial, Amber, 40 mL                            |
| 17J0283-22 C | VOA Vial, Amber, 40 mL                            |
| 17J0283-23 A | VOA Vial, Clear, 40 mL                            |
| 17J0283-23 B | VOA Vial, Clear, 40 mL                            |
| 17J0283-23 C | VOA Vial, Clear, 40 mL                            |
| 17J0283-24 A | VOA Vial, Clear, 40 mL                            |
| 17J0283-24 B | VOA Vial, Clear, 40 mL                            |
| 17J0283-24 C | VOA Vial, Clear, 40 mL                            |
| 17J0283-25 A | VOA Vial, Amber, 40 mL                            |
| 17J0283-25 B | VOA Vial, Amber, 40 mL                            |
| 17J0283-25 C | VOA Vial, Amber, 40 mL                            |
| 17J0283-26 A | VOA Vial, Amber, 40 mL                            |
| 17J0283-26 B | VOA Vial, Amber, 40 mL                            |
| 17J0283-26 C | VOA Vial, Amber, 40 mL                            |
| 17J0283-27 A | VOA Vial, Amber, 40 mL                            |
| 17J0283-27 B | VOA Vial, Amber, 40 mL                            |
| 17J0283-27 C | VOA Vial, Amber, 40 mL                            |
| 17J0283-27 D | HDPE NM, 500 mL, 1:1 HNO3 <i>&lt; 2 pass</i>      |
| 17J0283-28 A | VOA Vial, Amber, 40 mL                            |

*SLF*

*10/18/17*



WORK ORDER

17J0283

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |

|              |                             |                   |
|--------------|-----------------------------|-------------------|
| 17J0283-28 B | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-28 C | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-28 D | HDPE NM, 500 mL, 1:1 HNO3   | < 2 pass          |
| 17J0283-29 A | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-29 B | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-29 C | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-29 D | HDPE NM, 500 mL, 1:1 HNO3   | < 2 pass          |
| 17J0283-30 A | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-30 B | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-30 C | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-30 D | HDPE NM, 500 mL, 1:1 HNO3   | < 2 pass          |
| 17J0283-31 A | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-31 B | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-31 C | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-31 D | HDPE NM, 500 mL, 1:1 HNO3   | < 2 pass          |
| 17J0283-32 A | VOA Vial, Clear, 40 mL      |                   |
| 17J0283-32 B | VOA Vial, Clear, 40 mL      |                   |
| 17J0283-32 C | VOA Vial, Clear, 40 mL      |                   |
| 17J0283-32 D | HDPE NM, 500 mL, 1:1 HNO3   | < 2 pass          |
| 17J0283-33 A | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-33 B | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-33 C | VOA Vial, Amber, 40 mL      |                   |
| 17J0283-33 D | HDPE NM, 500 mL, 1:1 HNO3   | < 2 pass          |
| 17J0283-34 A | VOA Vial, Clear, 40 mL, HCL | < 2 pass SLF      |
| 17J0283-34 B | VOA Vial, Clear, 40 mL, HCL | < 2 pass 10/18/17 |
| 17J0283-34 C | VOA Vial, Clear, 40 mL, HCL | < 2 pass          |
| 17J0283-34 D | VOA Vial, Clear, 40 mL, HCL | < 2 pass          |

SLF  
Preservation Confirmed By

10/18/17  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                       | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|---------------------------------|---------------|--------|-------------------|-------------------|
| GW-3A3-1R-101617-8.2-13.2-(20)  | 17J0283-01    | Water  | 16-Oct-2017 10:15 | 17-Oct-2017 14:05 |
| GW-3A2-2R-101617-22.3-27.3-(20) | 17J0283-02    | Water  | 16-Oct-2017 10:25 | 17-Oct-2017 14:05 |
| GW-3A7-1R-101617-(20)           | 17J0283-03    | Water  | 16-Oct-2017 11:45 | 17-Oct-2017 14:05 |
| GW-3A6-2R-101617-(20)           | 17J0283-04    | Water  | 16-Oct-2017 12:00 | 17-Oct-2017 14:05 |
| GW-4B4-1-101617-(20)            | 17J0283-05    | Water  | 16-Oct-2017 14:00 | 17-Oct-2017 14:05 |
| GW-4B4-2-101617-(20)            | 17J0283-06    | Water  | 16-Oct-2017 13:30 | 17-Oct-2017 14:05 |
| GW-4B4-2-101617-(21)            | 17J0283-07    | Water  | 16-Oct-2017 13:35 | 17-Oct-2017 14:05 |
| GW-5B1-1R-101617-(20)           | 17J0283-08    | Water  | 16-Oct-2017 15:15 | 17-Oct-2017 14:05 |
| GW-5B1-2R-101617-(20)           | 17J0283-09    | Water  | 16-Oct-2017 15:30 | 17-Oct-2017 14:05 |
| GW-5C16-1R-101717-(20)          | 17J0283-11    | Water  | 17-Oct-2017 09:45 | 17-Oct-2017 14:05 |
| GW-5C16-1R-101717-(21)          | 17J0283-12    | Water  | 17-Oct-2017 09:50 | 17-Oct-2017 14:05 |
| GW-5C16-2R-101717-(20)          | 17J0283-13    | Water  | 17-Oct-2017 09:55 | 17-Oct-2017 14:05 |
| GW-5C12-1-101717-(20)           | 17J0283-14    | Water  | 17-Oct-2017 11:00 | 17-Oct-2017 14:05 |
| GW-5C10-2-101717-(20)           | 17J0283-15    | Water  | 17-Oct-2017 11:15 | 17-Oct-2017 14:05 |
| GW-4C1-1-101717-(20)            | 17J0283-16    | Water  | 17-Oct-2017 12:20 | 17-Oct-2017 14:05 |
| GW-5C14-2-101717-(20)           | 17J0283-17    | Water  | 17-Oct-2017 12:35 | 17-Oct-2017 14:05 |
| GW-3A3-1R-101617-8.2-13.2       | 17J0283-18    | Water  | 16-Oct-2017 10:15 | 17-Oct-2017 14:05 |
| GW-3A2-2R-101617-22.3-27.3      | 17J0283-19    | Water  | 16-Oct-2017 10:25 | 17-Oct-2017 14:05 |
| GW-3A7-1R-101617                | 17J0283-20    | Water  | 16-Oct-2017 11:45 | 17-Oct-2017 14:05 |
| GW-3A6-2R-101617                | 17J0283-21    | Water  | 16-Oct-2017 12:00 | 17-Oct-2017 14:05 |
| GW-4B4-1-101617                 | 17J0283-22    | Water  | 16-Oct-2017 14:00 | 17-Oct-2017 14:05 |
| GW-4B4-2-101617                 | 17J0283-23    | Water  | 16-Oct-2017 13:30 | 17-Oct-2017 14:05 |
| GW-4B4-2-101617-(01)            | 17J0283-24    | Water  | 16-Oct-2017 13:35 | 17-Oct-2017 14:05 |
| GW-5B1-1R-101617                | 17J0283-25    | Water  | 16-Oct-2017 15:15 | 17-Oct-2017 14:05 |
| GW-5B1-2R-101617                | 17J0283-26    | Water  | 16-Oct-2017 15:30 | 17-Oct-2017 14:05 |
| GW-5C16-1R-101717               | 17J0283-27    | Water  | 17-Oct-2017 09:45 | 17-Oct-2017 14:05 |
| GW-5C16-1R-101717-(01)          | 17J0283-28    | Water  | 17-Oct-2017 09:50 | 17-Oct-2017 14:05 |
| GW-5C16-2R-101717               | 17J0283-29    | Water  | 17-Oct-2017 09:55 | 17-Oct-2017 14:05 |
| GW-5C12-1-101717                | 17J0283-30    | Water  | 17-Oct-2017 11:00 | 17-Oct-2017 14:05 |
| GW-5C10-2-101717                | 17J0283-31    | Water  | 17-Oct-2017 11:15 | 17-Oct-2017 14:05 |
| GW-4C1-1-101717                 | 17J0283-32    | Water  | 17-Oct-2017 12:30 | 17-Oct-2017 14:05 |
| GW-5C14-2-101717                | 17J0283-33    | Water  | 17-Oct-2017 12:35 | 17-Oct-2017 14:05 |
| TB                              | 17J0283-34    | Water  | 16-Oct-2017 00:00 | 17-Oct-2017 14:05 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 17, 2017 under ARI workorder 17J0283. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Anions - EPA Method 300.0

Select samples were re-analyzed outside of the recommended holding times due to the high concentration of Chloride. These samples have been flagged with an "H" qualifier.

The samples were started at a 100x dilution due to the historically high Chloride. Also due to high Chloride and Bromide there was a large amount of matrix interference in the samples.

Sample GW-5C16-2R-101717-(20) has odd peaks for Sulfate in the initial run and additional diluted runs. The sample has a large amount of matrix interference. The Sulfate increased with each dilution, so the analyst ran the sample using EPA method 375.2 as well as the 300.0 to verify the concentrations. All of the dilutions and methods were reported.

Method blank BFJ0479 has Sulfate detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-3A3-1R-101617-8.2-13.2-(20) as well as its reanalyses. The matrix spike percent recoveries and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5C16-1R-101717-(01)-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

### Dissolved Organic Carbon - Method SM5310

The samples were analyzed within the recommended holding times.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

**Total Dissolved Solids - EPA Method 160.1**

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-3A3-1R-101617-8.2-13.2-(20). The duplicate RPD was within QC limits.

**Alkalinity - Method SM2320**

The samples were analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-3A3-1R-101617-8.2-13.2-(20). The duplicate RPD was within QC limits.

A duplicate was prepared in conjunction with sample GW-5C16-1R-101717-(01)-(20). The duplicate RPD was within QC limits.

**Total and Dissolved Metals - EPA Method 200.8**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

**Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

The method blank BFJ0580 has Iron and Sodium detected below the reporting limits, but above the method detection limits. These metals have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

#### **Total and Dissolved Hg - EPA Method 7470A**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2-(20)**  
**17J0283-01 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 10:15  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>2480</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2-(20)**  
**17J0283-01 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 10:15  
Analyzed: 17-Oct-2017 20:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.57</b> | mg-P/L | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2-(20)**  
**17J0283-01 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/16/2017 10:15  
Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 824    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 824    | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2-(20)**  
**17J0283-01 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 10:15  
Analyzed: 20-Oct-2017 22:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>27.9</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2-(20)**  
**17J0283-01RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 10:15  
Analyzed: 18-Oct-2017 12:41

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | H, U  |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2-(20)**  
**17J0283-01RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 10:15  
Analyzed: 19-Oct-2017 13:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | <b>251</b> | mg/L  | B, D  |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2-(20)**  
**17J0283-01RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 10:15  
Analyzed: 20-Oct-2017 00:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>879</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2-(20)**  
**17J0283-01RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 10:15  
Analyzed: 31-Oct-2017 17:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>5.78</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A2-2R-101617-22.3-27.3-(20)**  
**17J0283-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 10:25  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>51700</b> | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A2-2R-101617-22.3-27.3-(20)**  
**17J0283-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 10:25  
Analyzed: 17-Oct-2017 21:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>17.0</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | <b>1.49</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | ND     | mg-P/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
05-Dec-2017 12:33

**GW-3A2-2R-101617-22.3-27.3-(20)**  
**17J0283-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/16/2017 10:25

Instrument: Accumet AR60

Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1660   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1660   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A2-2R-101617-22.3-27.3-(20)**  
**17J0283-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 10:25  
Analyzed: 20-Oct-2017 22:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>34.1</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
05-Dec-2017 12:33

**GW-3A2-2R-101617-22.3-27.3-(20)**  
**17J0283-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 10:25  
Analyzed: 19-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | 715    | mg/L  | B, D  |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A2-2R-101617-22.3-27.3-(20)**  
**17J0283-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 10:25  
Analyzed: 20-Oct-2017 02:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 25000    | 2500            | <b>34000</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A7-1R-101617-(20)**  
**17J0283-03 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 11:45  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 75 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>1030</b> | mg/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A7-1R-101617-(20)**  
**17J0283-03 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 11:45  
Analyzed: 17-Oct-2017 22:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>3.63</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>9.54</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>7.19</b> | mg/L  | B, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Reported:  
05-Dec-2017 12:33

**GW-3A7-1R-101617-(20)**  
**17J0283-03 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/16/2017 11:45

Instrument: Accumet AR60

Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 399    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 399    | mg/L CaCO3 |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A7-1R-101617-(20)**  
**17J0283-03 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 11:45  
Analyzed: 23-Oct-2017 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>149</b> | mg/L  | D     |



Pioneer Technologies Corporation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A7-1R-101617-(20)**  
**17J0283-03RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 11:45  
Analyzed: 18-Oct-2017 11:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>1.30</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-3A7-1R-101617-(20)**  
**17J0283-03RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 11:45  
Analyzed: 20-Oct-2017 02:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>236</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A6-2R-101617-(20)**  
**17J0283-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 12:00  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>80800</b> | mg/L  |       |





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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-3A6-2R-101617-(20)**  
**17J0283-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/16/2017 12:00

Instrument: Accumet AR60

Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1360</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1360</b> | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A6-2R-101617-(20)**  
**17J0283-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 12:00  
Analyzed: 23-Oct-2017 15:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>42.2</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A6-2R-101617-(20)**  
**17J0283-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 12:00  
Analyzed: 18-Oct-2017 13:40

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | 25.3   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 20       | 2.00            | ND     | mg-N/L | U, H  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 20       | 2.00            | ND     | mg-N/L | U, H  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | ND     | mg-P/L | U, H  |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A6-2R-101617-(20)**  
**17J0283-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 12:00  
Analyzed: 19-Oct-2017 14:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>626</b> | mg/L  | B, D  |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-3A6-2R-101617-(20)**  
**17J0283-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 12:00  
Analyzed: 20-Oct-2017 16:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 25000    | 2500            | <b>53500</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-1-101617-(20)**  
**17J0283-05 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 14:00  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 100 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>333</b> | mg/L  |       |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-4B4-1-101617-(20)**  
**17J0283-05 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 14:00  
Analyzed: 17-Oct-2017 22:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.352</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.125</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-4B4-1-101617-(20)**  
**17J0283-05 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/16/2017 14:00  
Analyzed: 20-Oct-2017 15:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590 Sample Size: 100 mL  
Prepared: 20-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 133    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 133    | mg/L CaCO3 |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-1-101617-(20)**  
**17J0283-05 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 14:00  
Analyzed: 23-Oct-2017 16:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>8.04</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-1-101617-(20)**  
**17J0283-05RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 14:00  
Analyzed: 19-Oct-2017 14:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2        | 0.200           | <b>2.68</b> | mg/L  | B, D  |



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Olympia WA, 98503

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**Reported:**  
05-Dec-2017 12:33

**GW-4B4-1-101617-(20)**  
**17J0283-05RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 14:00  
Analyzed: 20-Oct-2017 16:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 50       | 5.00            | <b>96.0</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(20)**  
**17J0283-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 13:30  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>68300</b> | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
05-Dec-2017 12:33

**GW-4B4-2-101617-(20)**  
**17J0283-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 13:30  
Analyzed: 17-Oct-2017 23:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | ND     | mg-P/L | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-4B4-2-101617-(20)**  
**17J0283-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/16/2017 13:30

Instrument: Accumet AR60

Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1430   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1430   | mg/L CaCO3 |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(20)**  
**17J0283-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 13:30  
Analyzed: 23-Oct-2017 16:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | 35.2   | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(20)**  
**17J0283-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 13:30  
Analyzed: 19-Oct-2017 15:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | <b>469</b> | mg/L  | B, D  |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(20)**  
**17J0283-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 13:30  
Analyzed: 20-Oct-2017 18:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 20000    | 2000            | <b>45800</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(21)**  
**17J0283-07 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 13:35  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>54600</b> | mg/L  |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(21)**  
**17J0283-07 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 13:35  
Analyzed: 18-Oct-2017 00:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>6.52</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(21)**  
**17J0283-07 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/16/2017 13:35

Instrument: Accumet AR60

Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1450   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1450   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(21)**  
**17J0283-07 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 13:35  
Analyzed: 23-Oct-2017 16:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>35.6</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(21)**  
**17J0283-07RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 13:35  
Analyzed: 18-Oct-2017 12:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(21)**  
**17J0283-07RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 13:35  
Analyzed: 19-Oct-2017 15:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | <b>464</b> | mg/L  | B, D  |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4B4-2-101617-(21)**  
**17J0283-07RE5 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 13:35  
Analyzed: 31-Oct-2017 23:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 20000    | 2000            | <b>46400</b> | mg/L  | D     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-1R-101617-(20)**  
**17J0283-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 15:15  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 50 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1590</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5B1-1R-101617-(20)**  
**17J0283-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 15:15  
Analyzed: 18-Oct-2017 00:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>1.61</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.681</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.99</b> | mg-P/L |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-1R-101617-(20)**  
**17J0283-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/16/2017 15:15  
Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>204</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>394</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>598</b> | mg/L CaCO3 |       |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-1R-101617-(20)**  
**17J0283-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 15:15  
Analyzed: 23-Oct-2017 17:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>15.8</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-1R-101617-(20)**  
**17J0283-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 15:15  
Analyzed: 19-Oct-2017 21:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>16.9</b> | mg/L  | B, D  |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-1R-101617-(20)**  
**17J0283-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 15:15  
Analyzed: 20-Oct-2017 19:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>493</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5B1-2R-101617-(20)**  
**17J0283-09 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/16/2017 15:30  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>27300</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-2R-101617-(20)**  
**17J0283-09 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 15:30  
Analyzed: 18-Oct-2017 00:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>1.36</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>1.63</b> | mg-P/L | D     |





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Reported:  
05-Dec-2017 12:33

**GW-5B1-2R-101617-(20)**  
**17J0283-09 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/16/2017 15:30  
Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1600   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1600   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-2R-101617-(20)**  
**17J0283-09 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/16/2017 15:30  
Analyzed: 23-Oct-2017 17:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>20.9</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-2R-101617-(20)**  
**17J0283-09RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 15:30  
Analyzed: 19-Oct-2017 22:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2000     | 200             | <b>2800</b> | mg/L  | B, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-2R-101617-(20)**  
**17J0283-09RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 15:30  
Analyzed: 20-Oct-2017 20:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>11400</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5B1-2R-101617-(20)**  
**17J0283-09RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/16/2017 15:30  
Analyzed: 21-Oct-2017 16:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>20.6</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 09:45  
Analyzed: 23-Oct-2017 17:27

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 55.8   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 0.146  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 12.8   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 0.0062 | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 10.0   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 20.3   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | 344    | mg/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/17/2017 09:45  
Analyzed: 30-Oct-2017 18:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/17/2017 09:45  
Analyzed: 30-Oct-2017 18:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 2        | 0.680           | 1.00            | ND           | ug/L  | U     |
| Nickel, Dissolved | 7440-02-0  | 2        | 0.100           | 1.00            | <b>0.842</b> | ug/L  | J, D  |

Instrument: ICPMS2 Analyzed: 27-Oct-2017 16:20

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>503</b> | ug/L  | D     |





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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 09:45  
Analyzed: 27-Oct-2017 16:27

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 09:45  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 75 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>1060</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:45  
Analyzed: 18-Oct-2017 01:08

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.458</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.302</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.36</b> | mg-P/L |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/17/2017 09:45  
Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 306    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 306    | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 09:45  
Analyzed: 23-Oct-2017 18:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>9.48</b> | mg/L  | D     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:45  
Analyzed: 19-Oct-2017 22:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>19.9</b> | mg/L  | B, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(20)**  
**17J0283-11RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:45  
Analyzed: 20-Oct-2017 20:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | 427    | mg/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 09:50  
Analyzed: 23-Oct-2017 17:32

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>52.8</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.135</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>12.0</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0068</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>9.79</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>20.3</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>335</b>    | mg/L  |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/17/2017 09:50  
Analyzed: 30-Oct-2017 18:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/17/2017 09:50  
Analyzed: 30-Oct-2017 18:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 2        | 0.680           | 1.00            | ND           | ug/L  | U     |
| Nickel, Dissolved | 7440-02-0  | 2        | 0.100           | 1.00            | <b>0.900</b> | ug/L  | J, D  |

Instrument: ICPMS2 Analyzed: 27-Oct-2017 16:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>456</b> | ug/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 09:50  
Analyzed: 27-Oct-2017 16:28

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765  
Prepared: 26-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 09:50  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 75 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>1020</b> | mg/L  |       |



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Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:50  
Analyzed: 18-Oct-2017 16:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503  
Prepared: 18-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.441</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.316</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.41</b> | mg-P/L |       |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/17/2017 09:50  
Analyzed: 18-Oct-2017 09:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0491  
Prepared: 18-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 309    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 309    | mg/L CaCO3 |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 09:50  
Analyzed: 23-Oct-2017 18:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>9.22</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:50  
Analyzed: 19-Oct-2017 23:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>16.3</b> | mg/L  | B, D  |





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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(21)**  
**17J0283-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:50  
Analyzed: 20-Oct-2017 21:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>421</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 09:55  
Analyzed: 27-Oct-2017 21:21

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>57.0</b>  | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>80.8</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>107</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.864</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>134</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>41.6</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>5350</b>  | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 09:55  
Analyzed: 27-Oct-2017 16:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 09:55  
Analyzed: 27-Oct-2017 16:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>736</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND         | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND         | ug/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 09:55  
Analyzed: 27-Oct-2017 16:30

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 09:55  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>11900</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:55  
Analyzed: 18-Oct-2017 01:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>4.64</b> | mg/L  | B, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Wet Chemistry**

Method: EPA 375.2

Sampled: 10/17/2017 09:55

Instrument: LCHAT1

Analyzed: 02-Nov-2017 15:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049  
Prepared: 02-Nov-2017

Sample Size: 10 mL  
Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 2000            | ND     | mg/L  | U     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/17/2017 09:55  
Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>938</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>938</b> | mg/L CaCO3 |       |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 09:55  
Analyzed: 23-Oct-2017 19:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>27.9</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:55  
Analyzed: 18-Oct-2017 12:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>0.171</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | <b>1.56</b> | mg/L  | B     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13RE1 (Water)**

**Wet Chemistry**

Method: EPA 375.2  
Instrument: LCHAT1

Sampled: 10/17/2017 09:55  
Analyzed: 02-Nov-2017 16:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049 Sample Size: 10 mL  
Prepared: 02-Nov-2017 Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 200             | ND     | mg/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:55  
Analyzed: 19-Oct-2017 22:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479  
Prepared: 17-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>6.25</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>3.39</b> | mg/L  | D, B  |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13RE2 (Water)**

**Wet Chemistry**

Method: EPA 375.2

Sampled: 10/17/2017 09:55

Instrument: LCHAT1

Analyzed: 02-Nov-2017 17:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049  
Prepared: 02-Nov-2017

Sample Size: 10 mL  
Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 40.0            | ND     | mg/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 09:55  
Analyzed: 21-Oct-2017 17:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0479 Sample Size: 5 mL  
Prepared: 17-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>6160</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13RE3 (Water)**

**Wet Chemistry**

Method: EPA 375.2

Sampled: 10/17/2017 09:55

Instrument: LCHAT1

Analyzed: 02-Nov-2017 17:08

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049  
Prepared: 02-Nov-2017

Sample Size: 10 mL  
Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 10.0            | <b>11.3</b> | mg/L  | D     |





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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717-(20)**  
**17J0283-13RE4 (Water)**

**Wet Chemistry**

Method: EPA 375.2  
Instrument: LCHAT1

Sampled: 10/17/2017 09:55  
Analyzed: 02-Nov-2017 17:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049 Sample Size: 10 mL  
Prepared: 02-Nov-2017 Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 2.00            | <b>7.30</b> | mg/L  |       |



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Reported:  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 11:00  
Analyzed: 31-Oct-2017 21:05

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 10       | 0.0850          | 0.500           | <b>0.140</b>  | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 10       | 0.0510          | 0.500           | <b>29.5</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 10       | 0.0130          | 0.500           | <b>0.169</b>  | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 10       | 0.160           | 0.500           | <b>13.1</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 10       | 0.0034          | 0.0100          | <b>0.0093</b> | mg/L  | J, D  |
| Potassium, Dissolved | 7440-09-7  | 10       | 0.520           | 5.00            | <b>44.4</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 10       | 0.0520          | 0.600           | <b>434</b>    | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 10       | 19.0            | 500             | <b>1270</b>   | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/17/2017 11:00  
Analyzed: 30-Oct-2017 18:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 11:00  
Analyzed: 27-Oct-2017 17:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1020</b> | ug/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 11:00  
Analyzed: 27-Oct-2017 16:32

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 11:00  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>3780</b> | mg/L  |       |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 11:00  
Analyzed: 18-Oct-2017 17:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503  
Prepared: 18-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>1.92</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.847</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.23</b> | mg-P/L |       |



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Reported:  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/17/2017 11:00  
Analyzed: 18-Oct-2017 09:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0491  
Prepared: 18-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-----------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>1070</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | <b>304</b> | mg/L CaCO3 |       |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1370</b> | mg/L CaCO3 |       |





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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 11:00  
Analyzed: 23-Oct-2017 20:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>12.1</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/17/2017 11:00  
Analyzed: 30-Oct-2017 18:45

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel, Dissolved | 7440-02-0  | 5        | 0.250           | 2.50            | <b>5.12</b> | ug/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 11:00  
Analyzed: 20-Oct-2017 22:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>1000</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717-(20)**  
**17J0283-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 11:00  
Analyzed: 25-Oct-2017 19:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | <b>52.6</b> | mg/L  | D     |



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Reported:  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 11:15  
Analyzed: 27-Oct-2017 21:29

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | 1.58   | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | 53.0   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | 48.6   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | 104    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | 0.594  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | 129    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | 25.4   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | 4470   | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 11:15  
Analyzed: 27-Oct-2017 17:09

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>6.32</b> | ug/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 11:15  
Analyzed: 27-Oct-2017 17:09

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>873</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>56.7</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>22.2</b> | ug/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 11:15  
Analyzed: 27-Oct-2017 16:33

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 11:15  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>10700</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 11:15  
Analyzed: 18-Oct-2017 18:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503  
Prepared: 18-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>8.99</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>6.10</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>3.42</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>4.29</b> | mg/L  | B, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/17/2017 11:15

Instrument: Accumet AR60

Analyzed: 18-Oct-2017 09:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0491  
Prepared: 18-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1200   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1200   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 11:15  
Analyzed: 23-Oct-2017 20:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 11.22    | 5.61            | <b>524</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717-(20)**  
**17J0283-15RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 11:15  
Analyzed: 20-Oct-2017 22:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>5910</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 12:20  
Analyzed: 27-Oct-2017 16:48

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | <b>0.158</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>1.90</b>  | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>4.26</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | ND           | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | ND           | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>20.8</b>  | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>214</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>1060</b>  | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 12:20  
Analyzed: 27-Oct-2017 17:14

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>5.02</b> | ug/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 12:20  
Analyzed: 27-Oct-2017 17:14

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>111</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>11.2</b> | ug/L  | D     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 12:20  
Analyzed: 27-Oct-2017 16:35

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765  
Prepared: 26-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 12:20  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>3080</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 12:20  
Analyzed: 18-Oct-2017 18:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>1.92</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>4.90</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/17/2017 12:20

Instrument: Accumet AR60

Analyzed: 18-Oct-2017 09:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0491  
Prepared: 18-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 1340   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | 15.9   | mg/L CaCO3 |       |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1350   | mg/L CaCO3 |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 12:20  
Analyzed: 23-Oct-2017 21:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>69.7</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 12:20  
Analyzed: 19-Oct-2017 12:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 20       | 2.00            | <b>13.3</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>48.1</b> | mg/L  | B, D  |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 12:20  
Analyzed: 19-Oct-2017 12:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U, H  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | H, U  |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717-(20)**  
**17J0283-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 12:20  
Analyzed: 20-Oct-2017 23:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>641</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 12:35  
Analyzed: 27-Oct-2017 21:25

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>89.4</b>  | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>0.719</b> | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>241</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.144</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>204</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>23.7</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>6130</b>  | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 12:35  
Analyzed: 27-Oct-2017 17:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 12:35  
Analyzed: 27-Oct-2017 17:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>236</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>2.84</b> | ug/L  | J, D  |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 12:35  
Analyzed: 27-Oct-2017 16:40

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765  
Prepared: 26-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 12:35  
Analyzed: 20-Oct-2017 08:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0560 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>14400</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 12:35  
Analyzed: 18-Oct-2017 18:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503  
Prepared: 18-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>2.59</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------|------------|----------|-----------------|-------------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | <b>1.58</b> | mg-N/L | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------|------------|----------|-----------------|-------------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | <b>1.83</b> | mg-N/L | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>1.51</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>5.48</b> | mg/L  | B, D  |



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Reported:  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/17/2017 12:35

Instrument: Accumet AR60

Analyzed: 18-Oct-2017 09:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0491  
Prepared: 18-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1980</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1980</b> | mg/L CaCO3 |       |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 12:35  
Analyzed: 23-Oct-2017 21:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0554 Sample Size: 20 mL  
Prepared: 19-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>42.8</b> | mg/L  | D     |





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**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 12:35  
Analyzed: 20-Oct-2017 23:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0503 Sample Size: 5 mL  
Prepared: 18-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>9380</b> | mg/L  | D     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717-(20)**  
**17J0283-17RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 12:35  
Analyzed: 31-Oct-2017 23:40

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>13.4</b> | mg/L  | D     |



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Reported:  
05-Dec-2017 12:33

**GW-3A3-1R-101617-8.2-13.2**  
**17J0283-18 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 10:15  
Analyzed: 19-Oct-2017 13:21

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.54</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.20</b> | ug/L   |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.11</b> | ug/L   | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 95.0 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 98.7 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 96.6 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101 %  |       |



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Reported:  
05-Dec-2017 12:33

**GW-3A2-2R-101617-22.3-27.3**  
**17J0283-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 10:25  
Analyzed: 19-Oct-2017 13:46

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.15</b> | ug/L  | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 110   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.0  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 98.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106   | %     |



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Olympia WA, 98503

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Reported:  
05-Dec-2017 12:33

**GW-3A7-1R-101617**  
**17J0283-20 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 11:45  
Analyzed: 19-Oct-2017 14:12

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.06</b> | ug/L   | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 97.6 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.4 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 94.8 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 98.7 % |       |



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Reported:  
05-Dec-2017 12:33

**GW-3A6-2R-101617**  
**17J0283-21 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 12:00  
Analyzed: 19-Oct-2017 14:39

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.16</b>     | ug/L          | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>5.43</b>     | ug/L          |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>115 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>98.9 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>99.9 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>108 %</i>  |       |



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Reported:  
05-Dec-2017 12:33

**GW-4B4-1-101617**  
**17J0283-22 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 14:00  
Analyzed: 19-Oct-2017 15:05

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.09</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 98.1 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 98.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 97.2 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102 %  |       |



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Reported:  
05-Dec-2017 12:33

**GW-4B4-2-101617**  
**17J0283-23 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 13:30  
Analyzed: 19-Oct-2017 15:31

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.07</b> | ug/L   | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.08</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 112 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 98.4 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 99.8 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 108 %  |       |





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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-4B4-2-101617-(01)**  
**17J0283-24 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 13:35  
Analyzed: 19-Oct-2017 15:57

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.08</b> | ug/L   | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.07</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 115 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.7 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 99.8 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 107 %  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5B1-1R-101617**  
**17J0283-25 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 15:15  
Analyzed: 19-Oct-2017 16:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.32</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.08</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 97.9 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.6 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 94.3 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 99.3 % |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5B1-2R-101617**  
**17J0283-26 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 15:30  
Analyzed: 19-Oct-2017 16:49

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 102   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.7  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717**  
**17J0283-27 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/17/2017 09:45  
Analyzed: 19-Oct-2017 17:15

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.26</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.10</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 97.1 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.6 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102 %  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717**  
**17J0283-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 09:45  
Analyzed: 27-Oct-2017 10:42

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717**  
**17J0283-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 09:45  
Analyzed: 26-Oct-2017 19:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>432</b>   | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.355</b> | ug/L  | J, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717**  
**17J0283-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 09:45  
Analyzed: 27-Oct-2017 14:48

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(01)**  
**17J0283-28 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/17/2017 09:50  
Analyzed: 19-Oct-2017 17:40

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.27</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.09</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 94.1 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.0 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 96.5 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 98.2 % |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(01)**  
**17J0283-28 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 09:50  
Analyzed: 27-Oct-2017 13:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(01)**  
**17J0283-28 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 09:50  
Analyzed: 26-Oct-2017 19:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>414</b>   | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.660</b> | ug/L  | J, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-1R-101717-(01)**  
**17J0283-28 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 09:50  
Analyzed: 27-Oct-2017 14:49

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583  
Prepared: 20-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C16-2R-101717**  
**17J0283-29 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/17/2017 09:55  
Analyzed: 20-Oct-2017 12:40

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0593 Sample Size: 10 mL  
Prepared: 20-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.48</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND              | ug/L          | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>99.4 %</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>97.9 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>95.1 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>100 %</i>  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717**  
**17J0283-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 09:55  
Analyzed: 27-Oct-2017 13:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717**  
**17J0283-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 09:55  
Analyzed: 26-Oct-2017 19:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>771</b>   | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.735</b> | ug/L  | J, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
05-Dec-2017 12:33

**GW-5C16-2R-101717**  
**17J0283-29 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 09:55  
Analyzed: 27-Oct-2017 14:51

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583  
Prepared: 20-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C12-1-101717**  
**17J0283-30 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/17/2017 11:00  
Analyzed: 20-Oct-2017 13:05

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0593 Sample Size: 10 mL  
Prepared: 20-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units       | Notes    |
|--|------------|----------|-----------------|-----------------|-----------------|-------------|----------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>6.00</b>     | ug/L        |          |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND              | ug/L        | U        |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.80</b>     | ug/L        |          |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.06</b>     | ug/L        | J        |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>101</i>  | <i>%</i> |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>97.7</i> | <i>%</i> |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>94.1</i> | <i>%</i> |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>100</i>  | <i>%</i> |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717**  
**17J0283-30 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 11:00  
Analyzed: 27-Oct-2017 13:16

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>0.900</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717**  
**17J0283-30 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 11:00  
Analyzed: 26-Oct-2017 20:01

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>938</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>3.08</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>5.68</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C12-1-101717**  
**17J0283-30 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 11:00  
Analyzed: 27-Oct-2017 14:53

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C10-2-101717**  
**17J0283-31 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/17/2017 11:15  
Analyzed: 20-Oct-2017 13:31

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0593 Sample Size: 10 mL  
Prepared: 20-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.30</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 104 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.4 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 96.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 103 %  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717**  
**17J0283-31 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 11:15  
Analyzed: 26-Oct-2017 20:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>10.8</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717**  
**17J0283-31 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 11:15  
Analyzed: 26-Oct-2017 20:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1000</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>74.1</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>29.9</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C10-2-101717**  
**17J0283-31 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 11:15  
Analyzed: 27-Oct-2017 14:54

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-4C1-1-101717**  
**17J0283-32 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/17/2017 12:30  
Analyzed: 20-Oct-2017 13:56

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0593 Sample Size: 10 mL  
Prepared: 20-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 94.5 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 95.8 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103 %  |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717**  
**17J0283-32 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 12:30  
Analyzed: 26-Oct-2017 20:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>18.8</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-4C1-1-101717**  
**17J0283-32 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 12:30  
Analyzed: 26-Oct-2017 20:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>163</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>24.9</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>17.0</b> | ug/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-4C1-1-101717**  
**17J0283-32 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 12:30  
Analyzed: 27-Oct-2017 14:56

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583  
Prepared: 20-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

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Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**GW-5C14-2-101717**  
**17J0283-33 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/17/2017 12:35  
Analyzed: 20-Oct-2017 14:21

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0593 Sample Size: 10 mL  
Prepared: 20-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.61</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.07</b> | ug/L  | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 102   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101   | %     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717**  
**17J0283-33 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 12:35  
Analyzed: 26-Oct-2017 20:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717**  
**17J0283-33 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 12:35  
Analyzed: 26-Oct-2017 20:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0535 Sample Size: 25 mL  
Prepared: 19-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>270</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>5.94</b> | ug/L  | J, D  |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**GW-5C14-2-101717**  
**17J0283-33 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 12:35  
Analyzed: 27-Oct-2017 14:58

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**TB**  
**17J0283-34 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 00:00  
Analyzed: 19-Oct-2017 12:54

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0553 Sample Size: 10 mL  
Prepared: 19-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 85.8 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.6 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 95.4 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 96.7 % |       |





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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0553 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0553-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 19-Oct-2017 Analyzed: 19-Oct-2017 11:14 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 4.96   |                 |                 | ug/L  | 5.00        |   | 99.2 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.92   |                 |                 | ug/L  | 5.00        |   | 98.5 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.76   |                 |                 | ug/L  | 5.00        |   | 95.3 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.05   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS (BFJ0553-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 19-Oct-2017 Analyzed: 19-Oct-2017 09:29 |      |             |      |           |       |
| Vinyl Chloride                    | 10.7   | 0.06            | 0.20            | ug/L  | 10.0        |   | 107  | 66-133      |      |           |       |
| Chloroform                        | 9.84   | 0.03            | 0.20            | ug/L  | 10.0        |   | 98.4 | 80-122      |      |           |       |
| Trichloroethene                   | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.95   |                 |                 | ug/L  | 5.00        |   | 99.1 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.67   |                 |                 | ug/L  | 5.00        |   | 93.4 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.90   |                 |                 | ug/L  | 5.00        |   | 98.0 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.90   |                 |                 | ug/L  | 5.00        |   | 97.9 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.89   |                 |                 | ug/L  | 5.00        |   | 97.9 | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0553-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 19-Oct-2017 Analyzed: 19-Oct-2017 09:56 |      |             |      |           |       |
| Vinyl Chloride                    | 10.5   | 0.06            | 0.20            | ug/L  | 10.0        |   | 105  | 66-133      | 1.40 | 30        |       |
| Chloroform                        | 10.2   | 0.03            | 0.20            | ug/L  | 10.0        |   | 102  | 80-122      | 3.52 | 30        |       |
| Trichloroethene                   | 9.82   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.2 | 80-120      | 2.94 | 30        |       |
| Tetrachloroethene                 | 10.0   | 0.05            | 0.20            | ug/L  | 10.0        |   | 100  | 80-120      | 5.00 | 30        |       |
| Surrogate: Dibromofluoromethane   | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.84   |                 |                 | ug/L  | 5.00        |   | 96.8 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.97   |                 |                 | ug/L  | 5.00        |   | 99.3 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.67   |                 |                 | ug/L  | 5.00        |   | 93.5 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.90   |                 |                 | ug/L  | 5.00        |   | 98.0 | 80-120      |      |           |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0593 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0593-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 12:14 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 4.61   |                 |                 | ug/L  | 5.00        |   | 92.2 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.89   |                 |                 | ug/L  | 5.00        |   | 97.8 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.69   |                 |                 | ug/L  | 5.00        |   | 93.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.07   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS (BFJ0593-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 09:43 |      |             |      |           |       |
| Vinyl Chloride                    | 10.5   | 0.06            | 0.20            | ug/L  | 10.0        |   | 105  | 66-133      |      |           |       |
| Chloroform                        | 9.79   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.9 | 80-122      |      |           |       |
| Trichloroethene                   | 9.72   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.2 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.96   | 0.05            | 0.20            | ug/L  | 10.0        |   | 99.6 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 5.10   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.71   |                 |                 | ug/L  | 5.00        |   | 94.3 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.03   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.94   |                 |                 | ug/L  | 5.00        |   | 98.8 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.15   |                 |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0593-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:08 |      |             |      |           |       |
| Vinyl Chloride                    | 10.5   | 0.06            | 0.20            | ug/L  | 10.0        |   | 105  | 66-133      | 0.10 | 30        |       |
| Chloroform                        | 9.72   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.2 | 80-122      | 0.75 | 30        |       |
| Trichloroethene                   | 9.80   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.0 | 80-120      | 0.74 | 30        |       |
| Tetrachloroethene                 | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |   | 103  | 80-120      | 2.89 | 30        |       |
| Surrogate: Dibromofluoromethane   | 4.92   |                 |                 | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.61   |                 |                 | ug/L  | 5.00        |   | 92.2 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.06   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.89   |                 |                 | ug/L  | 5.00        |   | 97.8 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.00   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0535 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0535-BLK1)</b> |         |        |                 |                 |       | Prepared: 19-Oct-2017 Analyzed: 26-Oct-2017 18:15 |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFJ0535-BS1)</b>    |         |        |                 |                 |       | Prepared: 19-Oct-2017 Analyzed: 26-Oct-2017 17:57 |               |      |             |     |           |       |
| Lead                        | 208     | 27.7   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Arsenic                     | 75a     | 26.4   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 106  | 80-120      |     |           |       |
| Copper                      | 63      | 27.6   | 0.340           | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Copper                      | 65      | 27.5   | 0.350           | 0.500           | ug/L  | 25.0  |               | 110  | 80-120      |     |           |       |
| Nickel                      | 60      | 26.8   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 107  | 80-120      |     |           |       |
| Nickel                      | 62      | 26.9   | 0.220           | 0.500           | ug/L  | 25.0  |               | 108  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0583 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0583-BLK1)</b> |         |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 14:31 |      |             |     |           |       |
| Mercury                     | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0583-BS1)</b>    |         |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 14:32 |      |             |     |           |       |
| Mercury                     | 0.00222 | 0.000100        | mg/L  | 0.00200     |   | 111  | 80-120      |     |           |       |



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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0580 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0580-BLK1)</b> |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 20:57 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0178 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0308 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFJ0580-BS1)</b> |       |        |        |      |       |   |      |        |  |  |   |
|                          |       |        |        |      |       | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 21:16 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.12  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 106  | 80-120 |  |  |   |
| Calcium, Dissolved       | 10.3  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 103  | 80-120 |  |  |   |
| Iron, Dissolved          | 2.23  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 112  | 80-120 |  |  |   |
| Magnesium, Dissolved     | 11.4  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 114  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.548 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 110  | 80-120 |  |  |   |
| Potassium, Dissolved     | 9.41  | 0.0520 | 0.500  | mg/L | 10.0  |   | 94.1 | 80-120 |  |  |   |
| Silicon, Dissolved       | 11.3  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 113  | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.67  | 0.0114 | 0.500  | mg/L | 10.0  |   | 96.7 | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.3  | 1.90   | 50.0   | mg/L | 10.0  |   | 103  | 80-120 |  |  | J |



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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0732 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0732-BLK2)</b> |         |        |                 |                 |       |   |               |      |             |     |           |       |
|                             |         |        |                 |                 |       | Prepared: 25-Oct-2017 Analyzed: 30-Oct-2017 17:17 |               |      |             |     |           |       |
| Arsenic, Dissolved          | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |

**LCS (BFJ0732-BS2)**

Prepared: 25-Oct-2017 Analyzed: 30-Oct-2017 17:21

|                    |     |      |        |       |      |      |  |      |        |  |  |  |
|--------------------|-----|------|--------|-------|------|------|--|------|--------|--|--|--|
| Arsenic, Dissolved | 75a | 24.2 | 0.0220 | 0.200 | ug/L | 25.0 |  | 96.9 | 80-120 |  |  |  |
|--------------------|-----|------|--------|-------|------|------|--|------|--------|--|--|--|

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0732-BLK1)</b> |         |        |                 |                 |       |   |               |      |             |     |           |       |
|                             |         |        |                 |                 |       | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 13:52 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |

**LCS (BFJ0732-BS1)**

Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 14:33

|                   |     |      |        |       |      |      |  |     |        |  |  |  |
|-------------------|-----|------|--------|-------|------|------|--|-----|--------|--|--|--|
| Lead, Dissolved   | 208 | 26.8 | 0.0680 | 0.100 | ug/L | 25.0 |  | 107 | 80-120 |  |  |  |
| Copper, Dissolved | 63  | 25.6 | 0.340  | 0.500 | ug/L | 25.0 |  | 102 | 80-120 |  |  |  |
| Copper, Dissolved | 65  | 26.2 | 0.350  | 0.500 | ug/L | 25.0 |  | 105 | 80-120 |  |  |  |
| Nickel, Dissolved | 60  | 25.1 | 0.0500 | 0.500 | ug/L | 25.0 |  | 101 | 80-120 |  |  |  |
| Nickel, Dissolved | 62  | 25.2 | 0.220  | 0.500 | ug/L | 25.0 |  | 101 | 80-120 |  |  |  |



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0765 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0765-BLK1)</b> |         |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 16:24 |      |             |     |           |       |
| Mercury, Dissolved          | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0765-BS1)</b>    |         |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 16:25 |      |             |     |           |       |
| Mercury, Dissolved          | 0.00211 | 0.000100        | mg/L  | 0.00200     |   | 106  | 80-120      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

Wet Chemistry - Quality Control

Batch BFJ0479 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0479-BLK1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 20:05                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate   | 0.119  | 0.100           | mg/L   |             |               |      |             |      |           | *     |
| <b>Blank (BFJ0479-BLK2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 17-Oct-2017 Analyzed: 18-Oct-2017 14:20                       |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| <b>LCS (BFJ0479-BS1)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 20:25                       |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 1.67   | 0.100           | mg/L   | 1.50        |               | 112  | 75-125      |      |           |       |
| Fluoride  | 1.49   | 0.100           | mg/L   | 1.50        |               | 99.2 | 75-125      |      |           |       |
| Nitrate-N   | 1.51   | 0.100           | mg-N/L | 1.50        |               | 100  | 75-125      |      |           |       |
| Nitrite-N   | 1.49   | 0.100           | mg-N/L | 1.50        |               | 99.3 | 75-125      |      |           |       |
| Orthophosphorus   | 1.45   | 0.10            | mg-P/L | 1.50        |               | 96.9 | 75-125      |      |           |       |
| Sulfate   | 1.54   | 0.100           | mg/L   | 1.50        |               | 103  | 75-125      |      |           | B     |
| <b>LCS (BFJ0479-BS2)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 17-Oct-2017 Analyzed: 18-Oct-2017 14:40                       |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 1.49   | 0.100           | mg/L   | 1.50        |               | 99.6 | 90-110      |      |           |       |
| Nitrate-N   | 1.51   | 0.100           | mg-N/L | 1.50        |               | 101  | 90-110      |      |           |       |
| Nitrite-N   | 1.49   | 0.100           | mg-N/L | 1.50        |               | 99.1 | 90-110      |      |           |       |
| Orthophosphorus   | 1.47   | 0.10            | mg-P/L | 1.50        |               | 98.3 | 90-110      |      |           |       |
| <b>Duplicate (BFJ0479-DUP1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0283-01 Prepared: 17-Oct-2017 Analyzed: 17-Oct-2017 21:04    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.26   | 0.500           | mg/L   |             | 1.25          |      |             | 0.88 | 20        | D     |
| Orthophosphorus   | 0.56   | 0.50            | mg-P/L |             | 0.57          |      |             | 1.95 | 20        | D     |
| <b>Duplicate (BFJ0479-DUP2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0283-01RE1 Prepared: 17-Oct-2017 Analyzed: 18-Oct-2017 13:01 |        |                 |        |             |               |      |             |      |           |       |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

Wet Chemistry - Quality Control

Batch BFJ0479 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte               | Result | Reporting Limit              | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|------------------------------|-------|-----------------------|---------------|-----------------------------|-------------|------|-----------|-------|
| <b>Duplicate (BFJ0479-DUP3)</b> |        | <b>Source: 17J0283-01RE2</b> |       | Prepared: 17-Oct-2017 |               | Analyzed: 19-Oct-2017 13:23 |             |      |           |       |
| Sulfate                         | 251    | 20.0                         | mg/L  |                       | 251           |                             |             | 0.09 | 20        | B, D  |

|                                 |     |                              |      |                       |     |                             |  |      |    |   |
|---------------------------------|-----|------------------------------|------|-----------------------|-----|-----------------------------|--|------|----|---|
| <b>Duplicate (BFJ0479-DUP4)</b> |     | <b>Source: 17J0283-01RE3</b> |      | Prepared: 17-Oct-2017 |     | Analyzed: 20-Oct-2017 01:48 |  |      |    |   |
| Chloride                        | 874 | 50.0                         | mg/L |                       | 879 |                             |  | 0.56 | 20 | D |

|                                   |      |                           |        |                       |      |                             |        |  |  |   |
|-----------------------------------|------|---------------------------|--------|-----------------------|------|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFJ0479-MS1)</b> |      | <b>Source: 17J0283-01</b> |        | Prepared: 17-Oct-2017 |      | Analyzed: 17-Oct-2017 21:24 |        |  |  |   |
| Orthophosphorus                   | 10.3 | 0.50                      | mg-P/L | 10.0                  | 0.57 | 97.0                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                              |        |                       |    |                             |        |  |  |  |
|-----------------------------------|------|------------------------------|--------|-----------------------|----|-----------------------------|--------|--|--|--|
| <b>Matrix Spike (BFJ0479-MS2)</b> |      | <b>Source: 17J0283-01RE1</b> |        | Prepared: 17-Oct-2017 |    | Analyzed: 18-Oct-2017 13:20 |        |  |  |  |
| Nitrate-N                         | 1.91 | 0.100                        | mg-N/L | 2.00                  | ND | 95.5                        | 75-125 |  |  |  |
| Nitrite-N                         | 1.92 | 0.100                        | mg-N/L | 2.00                  | ND | 96.2                        | 75-125 |  |  |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |     |                              |      |                       |     |                             |        |  |  |      |
|-----------------------------------|-----|------------------------------|------|-----------------------|-----|-----------------------------|--------|--|--|------|
| <b>Matrix Spike (BFJ0479-MS3)</b> |     | <b>Source: 17J0283-01RE2</b> |      | Prepared: 17-Oct-2017 |     | Analyzed: 19-Oct-2017 13:43 |        |  |  |      |
| Sulfate                           | 546 | 50.0                         | mg/L | 300                   | 251 | 98.0                        | 75-125 |  |  | B, D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                              |      |                       |     |                             |        |  |  |   |
|-----------------------------------|------|------------------------------|------|-----------------------|-----|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFJ0479-MS4)</b> |      | <b>Source: 17J0283-01RE3</b> |      | Prepared: 17-Oct-2017 |     | Analyzed: 20-Oct-2017 02:08 |        |  |  |   |
| Chloride                          | 1840 | 100                          | mg/L | 1000                  | 879 | 96.4                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**Wet Chemistry - Quality Control**

**Batch BFJ0491 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit    | Units      | Spike Level | Source Result                                     | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|---------------------------------|--------|--------------------|------------|-------------|---|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0491-BLK1)</b>     |        |                    |            |             |   |      |              |      |           |       |
|                                 |        |                    |            |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 09:25 |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00               | mg/L CaCO3 |             |   |      |              |      |           | U     |
| <b>Duplicate (BFJ0491-DUP1)</b> |        |                    |            |             |   |      |              |      |           |       |
|                                 |        | Source: 17J0283-12 |            |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 09:25 |      |              |      |           |       |
| Alkalinity, Total               | 314    | 1.00               | mg/L CaCO3 |             | 309   |      |              | 1.60 | 20        |       |
| <b>Reference (BFJ0491-SRM1)</b> |        |                    |            |             |   |      |              |      |           |       |
|                                 |        |                    |            |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 09:25 |      |              |      |           |       |
| Alkalinity, Total               | 105    | 1.00               | mg/L CaCO3 | 108         |   | 96.8 | 90.37-108.33 |      |           |       |



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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

Wet Chemistry - Quality Control

Batch BFJ0503 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit       | Units  | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------------|--------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0503-BLK1)</b>       |        |                       |        |             |   |      |             |      |           |       |
|                                   |        |                       |        |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 16:03 |      |             |      |           |       |
| Bromide                           | ND     | 0.100                 | mg/L   |             |   |      |             |      |           | U     |
| Chloride                          | ND     | 0.100                 | mg/L   |             |   |      |             |      |           | U     |
| Fluoride                          | ND     | 0.100                 | mg/L   |             |   |      |             |      |           | U     |
| Nitrate-N                         | ND     | 0.100                 | mg-N/L |             |   |      |             |      |           | U     |
| Nitrite-N                         | ND     | 0.100                 | mg-N/L |             |   |      |             |      |           | U     |
| Orthophosphorus                   | ND     | 0.10                  | mg-P/L |             |   |      |             |      |           | U     |
| Sulfate                           | ND     | 0.100                 | mg/L   |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0503-BS1)</b>          |        |                       |        |             |   |      |             |      |           |       |
|                                   |        |                       |        |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 16:23 |      |             |      |           |       |
| Bromide                           | 1.49   | 0.100                 | mg/L   | 1.50        |   | 99.5 | 90-110      |      |           |       |
| Chloride                          | 1.50   | 0.100                 | mg/L   | 1.50        |   | 99.9 | 90-110      |      |           |       |
| Fluoride                          | 1.51   | 0.100                 | mg/L   | 1.50        |   | 101  | 90-110      |      |           |       |
| Nitrate-N                         | 1.53   | 0.100                 | mg-N/L | 1.50        |   | 102  | 90-110      |      |           |       |
| Nitrite-N                         | 1.52   | 0.100                 | mg-N/L | 1.50        |   | 101  | 90-110      |      |           |       |
| Orthophosphorus                   | 1.50   | 0.10                  | mg-P/L | 1.50        |   | 100  | 90-110      |      |           |       |
| Sulfate                           | 1.53   | 0.100                 | mg/L   | 1.50        |   | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0503-DUP1)</b>   |        |                       |        |             |   |      |             |      |           |       |
|                                   |        | Source: 17J0283-12    |        |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 17:05 |      |             |      |           |       |
| Bromide                           | 0.445  | 0.100                 | mg/L   |             | 0.441   |      |             | 0.90 | 20        |       |
| Fluoride                          | 0.315  | 0.100                 | mg/L   |             | 0.316   |      |             | 0.32 | 20        |       |
| Nitrate-N                         | ND     | 0.100                 | mg-N/L |             | ND  |      |             |      |           | U     |
| Nitrite-N                         | ND     | 0.100                 | mg-N/L |             | ND  |      |             |      |           | U     |
| Orthophosphorus                   | 0.41   | 0.10                  | mg-P/L |             | 0.41  |      |             | 0.74 | 20        |       |
| <b>Duplicate (BFJ0503-DUP2)</b>   |        |                       |        |             |   |      |             |      |           |       |
|                                   |        | Source: 17J0283-12RE1 |        |             | Prepared: 18-Oct-2017 Analyzed: 19-Oct-2017 23:50 |      |             |      |           |       |
| Sulfate                           | 15.1   | 1.00                  | mg/L   |             | 16.3  |      |             | 7.78 | 20        | D     |
| <b>Duplicate (BFJ0503-DUP3)</b>   |        |                       |        |             |   |      |             |      |           |       |
|                                   |        | Source: 17J0283-12RE2 |        |             | Prepared: 18-Oct-2017 Analyzed: 20-Oct-2017 21:34 |      |             |      |           |       |
| Chloride                          | 425    | 20.0                  | mg/L   |             | 421   |      |             | 0.89 | 20        | D     |
| <b>Matrix Spike (BFJ0503-MS1)</b> |        |                       |        |             |   |      |             |      |           |       |
|                                   |        | Source: 17J0283-12    |        |             | Prepared: 18-Oct-2017 Analyzed: 18-Oct-2017 17:25 |      |             |      |           |       |
| Bromide                           | 2.34   | 0.200                 | mg/L   | 2.00        | 0.441   | 94.8 | 75-125      |      |           | D     |
| Fluoride                          | 2.40   | 0.200                 | mg/L   | 2.00        | 0.316   | 104  | 75-125      |      |           | D     |
| Nitrate-N                         | 2.07   | 0.200                 | mg-N/L | 2.00        | ND  | 104  | 75-125      |      |           | D     |
| Nitrite-N                         | 2.02   | 0.200                 | mg-N/L | 2.00        | ND  | 101  | 75-125      |      |           | D     |
| Orthophosphorus                   | 2.39   | 0.20                  | mg-P/L | 2.00        | 0.41  | 99.0 | 75-125      |      |           | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**Wet Chemistry - Quality Control**

**Batch BFJ0503 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0503-MS2) Source: 17J0283-12RE1 Prepared: 18-Oct-2017 Analyzed: 20-Oct-2017 00:09**

|         |      |      |      |      |      |      |        |  |  |   |
|---------|------|------|------|------|------|------|--------|--|--|---|
| Sulfate | 35.9 | 2.00 | mg/L | 20.0 | 16.3 | 98.1 | 75-125 |  |  | D |
|---------|------|------|------|------|------|------|--------|--|--|---|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0503-MS3) Source: 17J0283-12RE2 Prepared: 18-Oct-2017 Analyzed: 20-Oct-2017 21:54**

|          |     |      |      |     |     |      |        |  |  |   |
|----------|-----|------|------|-----|-----|------|--------|--|--|---|
| Chloride | 920 | 50.0 | mg/L | 500 | 421 | 99.8 | 75-125 |  |  | D |
|----------|-----|------|------|-----|-----|------|--------|--|--|---|

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**Reported:**  
05-Dec-2017 12:33

**Wet Chemistry - Quality Control**

**Batch BFJ0554 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: GM

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0554-BLK1)</b>         |        |                 |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 19:27 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0554-BS1)</b>            |        |                 |       |             | Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 19:50 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 20.5   | 0.50            | mg/L  | 20.0        |   | 102  | 90-110      |     |           |       |



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**Reported:**  
05-Dec-2017 12:33

**Wet Chemistry - Quality Control**

**Batch BFJ0560 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0560-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 08:56 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0560-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 08:56 |      |             |      |           |       |
| Dissolved Solids                | 505    | 5.0                       | mg/L  | 500         |   | 101  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0560-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17J0283-01</b> |       |             | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 08:56 |      |             |      |           |       |
| Dissolved Solids                | 2520   | 200                       | mg/L  |             | 2480  |      |             | 1.60 | 20        |       |



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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

Wet Chemistry - Quality Control

Batch BFJ0590 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level                                       | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|------------|---|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0590-BLK1)</b>     |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:50 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| <b>Blank (BFJ0590-BLK2)</b>     |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 15:05 |            |   |               |      |              |      |           |       |
| Alkalinity, Bicarbonate         | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| Alkalinity, Carbonate           | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| Alkalinity, Hydroxide           | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| <b>Duplicate (BFJ0590-DUP1)</b> |        | <b>Source: 17J0283-01</b>                         |            | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:50 |               |      |              |      |           |       |
| Alkalinity, Total               | 819    | 1.00  | mg/L CaCO3 |   | 824           |      |              | 0.61 | 20        |       |
| <b>Reference (BFJ0590-SRM1)</b> |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:50 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | 105    | 1.00  | mg/L CaCO3 | 108   |               | 96.8 | 90.37-108.33 |      |           |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
05-Dec-2017 12:33

**Wet Chemistry - Quality Control**

**Batch BFJ0733 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0733-BLK1)</b> |        |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:25 |      |             |     |           |       |
| Sulfate                     | ND     | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0733-BS1)</b>    |        |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:45 |      |             |     |           |       |
| Sulfate                     | 1.53   | 0.100           | mg/L  | 1.50        |   | 102  | 90-110      |     |           |       |





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Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

Wet Chemistry - Quality Control

Batch BFJ0895 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|---|-------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0895-BLK1)</b>       |        | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 17:16 |       |   |               |      |             |      |           |       |
| Bromide                           | ND     | 0.100   | mg/L  |   |               |      |             |      |           | U     |
| Fluoride                          | ND     | 0.100   | mg/L  |   |               |      |             |      |           | U     |
| <b>LCS (BFJ0895-BS1)</b>          |        | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 17:35 |       |   |               |      |             |      |           |       |
| Bromide                           | 1.51   | 0.100   | mg/L  | 1.50  |               | 100  | 90-110      |      |           |       |
| Fluoride                          | 1.56   | 0.100   | mg/L  | 1.50  |               | 104  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0895-DUP1)</b>   |        | <b>Source: 17J0283-01RE4</b>                      |       | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 18:14 |               |      |             |      |           |       |
| Fluoride                          | 5.85   | 0.500   | mg/L  |   | 5.78          |      |             | 1.19 | 20        | D     |
| <b>Matrix Spike (BFJ0895-MS1)</b> |        | <b>Source: 17J0283-01RE4</b>                      |       | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 19:15 |               |      |             |      |           |       |
| Fluoride                          | 15.7   | 1.00  | mg/L  | 10.0  | 5.78          | 99.1 | 75-125      |      |           | D     |

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**Reported:**  
05-Dec-2017 12:33

**Wet Chemistry - Quality Control**

**Batch BFK0049 - No Prep Wet Chem**

Instrument: LCHAT1 Analyst: RLM

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>Blank (BFK0049-BLK1)</b> |        |                 |       |             |               | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:31 |             |     |           |       |
| Sulfate                     | ND     | 2.00            | mg/L  |             |               |   |             |     |           | U     |
| <b>LCS (BFK0049-BS1)</b>    |        |                 |       |             |               | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:39 |             |     |           |       |
| Sulfate                     | 14.8   | 2.00            | mg/L  | 15.0        |               | 98.6  | 90-110      |     |           |       |



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Reported:  
05-Dec-2017 12:33

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 375.2 in Water</b>         |                                 |
| Sulfate                           | WADOE,NELAP                     |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |



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Reported:  
05-Dec-2017 12:33

**EPA 8260C in Water**

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Chloromethane                         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
05-Dec-2017 12:33

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,3-Dichloropropane         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene           | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

Alkalinity, Bicarbonate NELAP,WADOE,WA-DW,DoD-ELAP



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**Reported:**  
05-Dec-2017 12:33

Alkalinity, Carbonate WADOE,WA-DW,DoD-ELAP,NELAP  
Alkalinity, Hydroxide WADOE,WA-DW,DoD-ELAP,NELAP  
Alkalinity, Total DoD-ELAP,WADOE,WA-DW,NELAP

**SM 5310 B-00 in Water**

Dissolved Organic Carbon WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
05-Dec-2017 12:33

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



15 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0334

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: 10/19/17  
 Page: 1 of 1  
 No. of Coolers: 1  
 Cooler Temps:

Turn-around Requested: Normal  
 Phone: 360-570-1700  
 Pioneer Technologies  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: D Cooper: 206-680-3466  
 T Dreher / L Kerner / D Pickering

| Sample ID  | Date                                  | Time | Matrix | No Containers | Analysis Requested                       |  |                    |  |   |  |  |                                   |                         |   | Notes/Comments |
|--|---------------------------------------|------|--------|---------------|--|--|--------------------|--|---|--|--|-----------------------------------|-------------------------|---|----------------|
|  |                                       |      |        |               | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B |   |                |
| GW-5D7-1R-101917-(20)  | 10-19-17                              | 0900 | water  | 4             | X  | X  | X                  | X  | X   | X  | X  | X                                 | X                       | X | MS/MSD         |
| GW-5D7-1R-101917   | 10-19-17                              | 0900 |        | 4             | X  | X  | X                  | X  | X   | X  | X  | X                                 | X                       | X | MS/MSD         |
| GW-5D5-1-101917-(20)   |                                       | 0910 |        |               | X  | X  | X                  | X  | X   | X  | X  | X                                 | X                       | X |                |
| GW-5D5-1-101917  |                                       | 0910 |        |               | X  | X  | X                  | X  | X   | X  | X  | X                                 | X                       | X |                |
| GW-5E4-1-101917-(20)   |                                       | 1030 |        |               | X  | X  | X                  | X  | X   | X  | X  | X                                 | X                       | X |                |
| GW-5E4-1-101917- <del>11111</del>  |                                       | 1030 |        |               | X  | X  | X                  | X  | X   | X  | X  | X                                 | X                       | X |                |
| Comments/Special Instructions  | Relinquished by (Signature) Luke Horn |      |        |               | Relinquished by (Signature) Brandon Fisk |  |                    |  | Received by (Signature)                           |  |  |                                   |                         |   |                |
| Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Printed Name: Luke Horn               |      |        |               | Printed Name: Brandon Fisk               |  |                    |  | Printed Name                                      |  |  |                                   |                         |   |                |
|  | Company: DOF                          |      |        |               | Company: ARI                             |  |                    |  | Company   |  |  |                                   |                         |   |                |
|  | Date & Time: 10/19/17 12:10           |      |        |               | Date & Time: 10/19/17 1210               |  |                    |  | Date & Time                                       |  |  |                                   |                         |   |                |

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PDDAP/SEPSMS protocol will be stored frozen for up to one year and then discarded.





WORK ORDER

17J0334

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID    | Container Type                    | pH      |
|-----------------|-----------------------------------|---------|
| 17J0334-01 A    | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0334-01 B    | Small OJ, 500 mL                  |         |
| 17J0334-01 C    | Large OJ, 1000 mL                 |         |
| 17J0334-01 D    | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0334-02 A    | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0334-02 B    | Small OJ, 500 mL                  |         |
| 17J0334-02 C    | Large OJ, 1000 mL                 |         |
| 17J0334-02 D    | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0334-03 A    | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass |
| 17J0334-03 B    | Small OJ, 500 mL                  |         |
| 17J0334-03 C    | Large OJ, 1000 mL                 |         |
| 17J0334-03 D    | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 pass |
| 17J0334-04 A    | HDPE NM, 500 mL, 1:1 HNO3         | L2 pass |
| 17J0334-04 B    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-04 C    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-04 D    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-05 A    | HDPE NM, 500 mL, 1:1 HNO3         | L2 pass |
| 17J0334-05 B    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-05 C    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-05 D    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-06 A    | HDPE NM, 500 mL, 1:1 HNO3         | L2 pass |
| 17J0334-06 B pb | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-06 C lg | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-06 D lg | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-07 A    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-07 B    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-07 C    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-07 D sm | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-07 E    | VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0334-07 F    | VOA Vial, Clear, 40 mL, HCL       |         |



WORK ORDER

17J0334

|  |  |
|--|--|
| Client: Pioneer Technologies Corporation                 | Project Manager: Amanda Volgardsen                         |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |

SF  
\_\_\_\_\_  
Preservation Confirmed By

10/19/17  
\_\_\_\_\_  
Date





# Cooler Receipt Form

ARI Client: Pioneer  
 COC No(s): \_\_\_\_\_ NA  
 Assigned ARI Job No: 17J0334  
 Preliminary Examination Phase:

Project Name: Arkema FS DG Inv  
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_ (NA)

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO  
 Were custody papers included with the cooler? ..... YES NO  
 Were custody papers properly filled out (ink, signed, etc.) ..... YES NO  
 Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.5  
 Time: 1210

If cooler temperature is out of compliance fill out form 00070F  
 Cooler Accepted by: SF for BF Date: 10/19/17 Time: 1210  
 Temp Gun ID#: D002565

*Complete custody forms and attach all shipping documents*

### Log-In Phase:

Was a temperature blank included in the cooler? ..... YES NO  
 What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? ..... NA YES NO  
 Were all bottles sealed in individual plastic bags? ..... YES NO  
 Did all bottles arrive in good condition (unbroken)? ..... YES NO  
 Were all bottle labels complete and legible? ..... YES NO  
 Did the number of containers listed on COC match with the number of containers received? ..... YES NO  
 Did all bottle labels and tags agree with custody papers? ..... YES NO  
 Were all bottles used correct for the requested analyses? ..... YES NO  
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO  
 Were all VOC vials free of air bubbles? ..... NA YES NO  
 Was sufficient amount of sample sent in each bottle? ..... YES NO  
 Date VOC Trip Blank was made at ARI: ..... SF NA 10/16/17  
 Was Sample Split by ARI : NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: SF Date: 10/19/17 Time: 1312

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

Additional Notes, Discrepancies, & Resolutions:  
air bubbles on preservation sheet  
 By: SF Date: 10/19/17

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID             | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-----------------------|---------------|--------|-------------------|-------------------|
| GW-5D7-1R-101917-(20) | 17J0334-01    | Water  | 19-Oct-2017 09:00 | 19-Oct-2017 12:10 |
| GW-5D5-1-101917-(20)  | 17J0334-02    | Water  | 19-Oct-2017 09:10 | 19-Oct-2017 12:10 |
| GW-5E4-1-101917-(20)  | 17J0334-03    | Water  | 19-Oct-2017 10:30 | 19-Oct-2017 12:10 |
| GW-5D7-1R-101917      | 17J0334-04    | Water  | 19-Oct-2017 09:00 | 19-Oct-2017 12:10 |
| GW-5D5-1-101917       | 17J0334-05    | Water  | 19-Oct-2017 09:10 | 19-Oct-2017 12:10 |
| GW-5E4-1-101917       | 17J0334-06    | Water  | 19-Oct-2017 10:30 | 19-Oct-2017 12:10 |
| TB                    | 17J0334-07    | Water  | 16-Oct-2017 00:00 | 19-Oct-2017 12:10 |



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Reported:  
15-Nov-2017 16:38

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 19, 2017 under ARI workorder 17J0334. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

A matrix spike and matrix spike duplicate were prepared in conjunction with sample GW -5D7-1R-101917. The matrix spike/matrix spike duplicate percent recoveries and RPD were within QC limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW -5D7-1R-101917-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.



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Reported:  
15-Nov-2017 16:38

A matrix spike and duplicate were prepared in conjunction with sample GW-5D7-1R-101917. The duplicate RPD were within QC limits. The matrix spike has a natural concentration of Arsenic that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Arsenic has been flagged with an "HC" qualifier on the matrix spike. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-5D7-1R-101917-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFJ0580 has Sodium and Iron detected below the reporting limits, but above the method detection limits. The Sodium and Iron have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5D7-1R-101917-(20). The matrix spike percent recovery and duplicate RPD were within QC limits. The matrix spike has a Sodium concentration that exceeds the upper calibration range. The Sodium has been flagged with an "E" qualifier on the matrix spike. No further corrective action was taken.

#### **Anions - EPA Method 300.0**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

A duplicate was prepared in conjunction with sample GW-5D7-1R-101917-(20). The duplicate RPD was within QC limits.



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Reported:  
15-Nov-2017 16:38

**Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-5D7-1R-101917-(20). The duplicate RPD was within QC limits.

**Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample GW-5D5-1-101917-(20) instead of GW-5D7-1R-101917-(20) due to lack of volume after reanalysis. The matrix spike percent recovery and duplicate RPD was within QC limits.





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/19/2017 09:00  
Analyzed: 27-Oct-2017 21:06

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | 3.72   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | 3.02   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | 3.31   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | 0.0268 | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | 4.60   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | 33.6   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 0.0568          | 2.50            | 246    | mg/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/19/2017 09:00  
Analyzed: 27-Oct-2017 16:30

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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Reported:  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/19/2017 09:00  
Analyzed: 01-Nov-2017 20:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1000     | 22.0            | 200             | <b>90900</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND           | ug/L  | U     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/19/2017 09:00  
Analyzed: 27-Oct-2017 16:12

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0730 Sample Size: 20 mL  
Prepared: 25-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000330</b> | mg/L  |       |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/19/2017 09:00  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 100 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>787</b> | mg/L  |       |



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Reported:  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 09:00  
Analyzed: 20-Oct-2017 15:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.191</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.804</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.63</b> | mg-P/L |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/19/2017 09:00

Instrument: Accumet AR60

Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 265    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 265    | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 09:00  
Analyzed: 21-Oct-2017 22:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>26.4</b> | mg/L  | D     |





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**Reported:**  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 09:00  
Analyzed: 22-Oct-2017 05:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 100      | 10.0            | <b>196</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D7-1R-101917-(20)**  
**17J0334-01RE2 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/19/2017 09:00  
Analyzed: 13-Nov-2017 19:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0656 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>6.43</b> | mg/L  | D     |



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Reported:  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/19/2017 09:10  
Analyzed: 27-Oct-2017 15:47

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | 66.6   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | 126    | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | 71.1   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | 0.741  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | 95.6   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | 33.7   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | 3140   | mg/L  | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/19/2017 09:10  
Analyzed: 27-Oct-2017 17:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Reported:  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/19/2017 09:10  
Analyzed: 01-Nov-2017 20:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 200      | 4.40            | 40.0            | <b>44500</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND           | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/19/2017 09:10  
Analyzed: 27-Oct-2017 16:16

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0730 Sample Size: 20 mL  
Prepared: 25-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/19/2017 09:10  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 5 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>7840</b> | mg/L  |       |



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Reported:  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 09:10  
Analyzed: 20-Oct-2017 15:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | 1.12   | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |





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Olympia WA, 98503

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Reported:  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/19/2017 09:10

Instrument: Accumet AR60

Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 699    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 699    | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 09:10  
Analyzed: 21-Oct-2017 22:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>3.74</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 09:10  
Analyzed: 22-Oct-2017 06:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>4830</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02RE2 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/19/2017 09:10  
Analyzed: 13-Nov-2017 19:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0656 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>10.0</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917-(20)**  
**17J0334-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 09:10  
Analyzed: 25-Oct-2017 21:00

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>32.2</b> | mg/L  | D     |



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Reported:  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/19/2017 10:30  
Analyzed: 27-Oct-2017 15:42

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0580  
Prepared: 20-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | <b>0.236</b>  | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>12.2</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>1.25</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>4.33</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>0.0337</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>17.7</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>19.5</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>1770</b>   | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/19/2017 10:30  
Analyzed: 27-Oct-2017 17:29

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | 32.7   | ug/L  | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/19/2017 10:30  
Analyzed: 01-Nov-2017 19:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0732 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1000     | 22.0            | 200             | <b>96700</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>65.1</b>  | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>3.84</b>  | ug/L  | J, D  |





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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/19/2017 10:30  
Analyzed: 27-Oct-2017 16:18

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0730  
Prepared: 25-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result         | Units | Notes |
|--------------------|------------|----------|-----------------|----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.00103</b> | mg/L  |       |



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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/19/2017 10:30  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 10 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 100             | <b>4480</b> | mg/L  |       |



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Reported:  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 10:30  
Analyzed: 20-Oct-2017 16:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.810</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.51</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Reported:  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/19/2017 10:30

Instrument: Accumet AR60

Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 765    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 48.2   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 813    | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 10:30  
Analyzed: 20-Oct-2017 18:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 0.20            | <b>4.35</b> | mg-P/L | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 10:30  
Analyzed: 21-Oct-2017 23:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>8.08</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03RE2 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/19/2017 10:30  
Analyzed: 13-Nov-2017 20:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0656 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>58.9</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917-(20)**  
**17J0334-03RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/19/2017 10:30  
Analyzed: 22-Oct-2017 06:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>2200</b> | mg/L  | D     |





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Reported:  
15-Nov-2017 16:38

**GW-5D7-1R-101917**  
**17J0334-04 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/19/2017 09:00  
Analyzed: 23-Oct-2017 11:30

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.53</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.50</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 96.2  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 101   | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 95.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 98.1  | %     |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D7-1R-101917**  
**17J0334-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/19/2017 09:00  
Analyzed: 03-Nov-2017 19:14

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0727 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>2.44</b> | ug/L  | D     |



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Reported:  
15-Nov-2017 16:38

**GW-5D7-1R-101917**  
**17J0334-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/19/2017 09:00  
Analyzed: 02-Nov-2017 13:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0727 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 500      | 11.0            | 100             | <b>97100</b> | ug/L  | D     |

Instrument: ICPMS2

Analyzed: 03-Nov-2017 19:14

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0727 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>20.9</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>1.23</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D7-1R-101917**  
**17J0334-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/19/2017 09:00  
Analyzed: 27-Oct-2017 15:05

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result         | Units | Notes |
|---------|------------|----------|-----------------|----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.00141</b> | mg/L  |       |



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Reported:  
15-Nov-2017 16:38

**GW-5D5-1-101917**  
**17J0334-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/19/2017 09:10  
Analyzed: 23-Oct-2017 11:56

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.07</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 93.5 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 100 %  |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 98.2 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 99.5 % |       |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917**  
**17J0334-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/19/2017 09:10  
Analyzed: 27-Oct-2017 14:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0727 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.338</b> | ug/L  |       |



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Reported:  
15-Nov-2017 16:38

**GW-5D5-1-101917**  
**17J0334-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/19/2017 09:10  
Analyzed: 01-Nov-2017 20:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0727 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 500      | 11.0            | 100             | <b>48100</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 1        | 0.350           | 0.500           | <b>1.85</b>  | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.552</b> | ug/L  |       |



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**Reported:**  
15-Nov-2017 16:38

**GW-5D5-1-101917**  
**17J0334-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/19/2017 09:10  
Analyzed: 27-Oct-2017 15:07

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Reported:  
15-Nov-2017 16:38

**GW-5E4-1-101917**  
**17J0334-06 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/19/2017 10:30  
Analyzed: 23-Oct-2017 12:21

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.08</b> | ug/L   | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.31</b> | ug/L   |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 92.3 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.1 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 94.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102 %  |       |



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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917**  
**17J0334-06 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/19/2017 10:30  
Analyzed: 27-Oct-2017 17:34

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0727 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | 47.3   | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917**  
**17J0334-06 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/19/2017 10:30  
Analyzed: 01-Nov-2017 20:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0727 Sample Size: 25 mL  
Prepared: 25-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1000     | 22.0            | 200             | <b>93600</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>89.9</b>  | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>5.42</b>  | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 16:38

**GW-5E4-1-101917**  
**17J0334-06 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/19/2017 10:30  
Analyzed: 27-Oct-2017 15:08

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0583 Sample Size: 20 mL  
Prepared: 20-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000440</b> | mg/L  |       |



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Reported:  
15-Nov-2017 16:38

**TB**  
**17J0334-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/16/2017 00:00  
Analyzed: 23-Oct-2017 11:04

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 98.4 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 101 %  |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 95.0 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 98.2 % |       |



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Reported:  
15-Nov-2017 16:38

### Volatile Organic Compounds - Quality Control

#### Batch BFJ0653 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|--------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0653-BLK1)</b>       |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 10:39 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.66            |                    | ug/L  | 5.00        |   | 93.1 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.89            |                    | ug/L  | 5.00        |   | 97.9 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.80            |                    | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.96            |                    | ug/L  | 5.00        |   | 99.3 | 80-120      |      |           |       |
| <b>LCS (BFJ0653-BS1)</b>          |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 08:33 |      |             |      |           |       |
| Vinyl Chloride                    | 10.7   | 0.06            | 0.20               | ug/L  | 10.0        |   | 107  | 66-133      |      |           |       |
| Chloroform                        | 9.97   | 0.03            | 0.20               | ug/L  | 10.0        |   | 99.7 | 80-122      |      |           |       |
| Trichloroethene                   | 9.70   | 0.05            | 0.20               | ug/L  | 10.0        |   | 97.0 | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.0   | 0.05            | 0.20               | ug/L  | 10.0        |   | 100  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   |        | 4.86            |                    | ug/L  | 5.00        |   | 97.2 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.51            |                    | ug/L  | 5.00        |   | 90.2 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 5.08            |                    | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.80            |                    | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.95            |                    | ug/L  | 5.00        |   | 99.0 | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0653-BSD1)</b>     |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 08:58 |      |             |      |           |       |
| Vinyl Chloride                    | 10.2   | 0.06            | 0.20               | ug/L  | 10.0        |   | 102  | 66-133      | 4.94 | 30        |       |
| Chloroform                        | 9.42   | 0.03            | 0.20               | ug/L  | 10.0        |   | 94.2 | 80-122      | 5.67 | 30        |       |
| Trichloroethene                   | 9.69   | 0.05            | 0.20               | ug/L  | 10.0        |   | 96.9 | 80-120      | 0.08 | 30        |       |
| Tetrachloroethene                 | 9.91   | 0.05            | 0.20               | ug/L  | 10.0        |   | 99.1 | 80-120      | 1.24 | 30        |       |
| Surrogate: Dibromofluoromethane   |        | 4.93            |                    | ug/L  | 5.00        |   | 98.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.45            |                    | ug/L  | 5.00        |   | 89.0 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 5.06            |                    | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.77            |                    | ug/L  | 5.00        |   | 95.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.90            |                    | ug/L  | 5.00        |   | 98.0 | 80-120      |      |           |       |
| <b>Matrix Spike (BFJ0653-MS1)</b> |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 | Source: 17J0334-04 |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 18:46 |      |             |      |           |       |
| Vinyl Chloride                    | 10.5   | 0.06            | 0.20               | ug/L  | 10.0        | ND  | 105  | 66-133      |      |           |       |
| Chloroform                        | 9.98   | 0.03            | 0.20               | ug/L  | 10.0        | ND  | 99.8 | 80-122      |      |           |       |



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Reported:  
15-Nov-2017 16:38

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0653 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit           | Reporting Limit | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|--|--------|---------------------------|-----------------|-------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0653-MS1)</b>        |        |                           |                 |       |                       |               |                             |             |     |           |       |
|  |        | <b>Source: 17J0334-04</b> |                 |       | Prepared: 23-Oct-2017 |               | Analyzed: 23-Oct-2017 18:46 |             |     |           |       |
| Trichloroethene                          | 10.3   | 0.05                      | 0.20            | ug/L  | 10.0                  | 0.53          | 98.0                        | 80-120      |     |           |       |
| Tetrachloroethene                        | 10.3   | 0.05                      | 0.20            | ug/L  | 10.0                  | 0.50          | 98.2                        | 80-120      |     |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.00                      |                 | ug/L  | 5.00                  |               | 100                         | 80-120      |     |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.74                      |                 | ug/L  | 5.00                  | 4.81          | 94.9                        | 80-129      |     |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.95                      |                 | ug/L  | 5.00                  | 5.07          | 99.0                        | 80-120      |     |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.88                      |                 | ug/L  | 5.00                  | 4.77          | 97.6                        | 80-120      |     |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.94                      |                 | ug/L  | 5.00                  | 4.91          | 98.8                        | 80-120      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|  |      |                           |      |      |                       |      |                             |        |      |    |  |
|--|------|---------------------------|------|------|-----------------------|------|-----------------------------|--------|------|----|--|
| <b>Matrix Spike Dup (BFJ0653-MSD1)</b>   |      |                           |      |      |                       |      |                             |        |      |    |  |
|  |      | <b>Source: 17J0334-04</b> |      |      | Prepared: 23-Oct-2017 |      | Analyzed: 23-Oct-2017 19:12 |        |      |    |  |
| Vinyl Chloride                           | 10.2 | 0.06                      | 0.20 | ug/L | 10.0                  | ND   | 102                         | 66-133 | 2.50 | 30 |  |
| Chloroform                               | 9.77 | 0.03                      | 0.20 | ug/L | 10.0                  | ND   | 97.7                        | 80-122 | 2.15 | 30 |  |
| Trichloroethene                          | 10.1 | 0.05                      | 0.20 | ug/L | 10.0                  | 0.53 | 95.4                        | 80-120 | 2.48 | 30 |  |
| Tetrachloroethene                        | 10.1 | 0.05                      | 0.20 | ug/L | 10.0                  | 0.50 | 95.9                        | 80-120 | 2.20 | 30 |  |
| <i>Surrogate: Dibromofluoromethane</i>   |      | 4.99                      |      | ug/L | 5.00                  |      | 99.8                        | 80-120 |      |    |  |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |      | 4.71                      |      | ug/L | 5.00                  | 4.81 | 94.1                        | 80-129 |      |    |  |
| <i>Surrogate: Toluene-d8</i>             |      | 5.00                      |      | ug/L | 5.00                  | 5.07 | 100                         | 80-120 |      |    |  |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |      | 4.90                      |      | ug/L | 5.00                  | 4.77 | 97.9                        | 80-120 |      |    |  |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |      | 5.11                      |      | ug/L | 5.00                  | 4.91 | 102                         | 80-120 |      |    |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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**Reported:**  
15-Nov-2017 16:38

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0583 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0583-BLK1)</b> |         |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 14:31 |      |             |     |           |       |
| Mercury                     | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0583-BS1)</b>    |         |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 14:32 |      |             |     |           |       |
| Mercury                     | 0.00222 | 0.000100        | mg/L  | 0.00200     |   | 111  | 80-120      |     |           |       |





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Reported:  
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**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0727 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 Analyst: TCH

| QC Sample/Analyte                 | Isotope | Result                    | Detection Limit | Reporting Limit                                   | Units | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-----------------|---|-------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Duplicate (BFJ0727-DUP3)</b>   |         | <b>Source: 17J0334-04</b> |                 | Prepared: 25-Oct-2017 Analyzed: 02-Nov-2017 13:40 |       |             |               |      |             |      |           |       |
| Arsenic                           | 75a     | 91500                     | 11.0            | 100   | ug/L  |             | 97100         |      |             | 5.91 | 20        | D     |
| <b>Matrix Spike (BFJ0727-MS3)</b> |         | <b>Source: 17J0334-04</b> |                 | Prepared: 25-Oct-2017 Analyzed: 02-Nov-2017 13:48 |       |             |               |      |             |      |           |       |
| Arsenic                           | 75a     | 94600                     | 11.0            | 100   | ug/L  | 25.0        | 97100         | NR   | 75-125      |      |           | HC, D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte           | Isotope | Result  | Detection Limit | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|---|-----------------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0727-BLK1)</b> |         | Prepared: 25-Oct-2017 Analyzed: 01-Nov-2017 17:56 |                 |                 |       |             |               |      |             |     |           |       |
| Lead                        | 208     | ND  | 0.0680          | 0.100           | ug/L  |             |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND  | 0.0220          | 0.200           | ug/L  |             |               |      |             |     |           | U     |
| Copper                      | 63      | ND  | 0.340           | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Copper                      | 65      | ND  | 0.350           | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Nickel                      | 60      | ND  | 0.0500          | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Nickel                      | 62      | ND  | 0.220           | 0.500           | ug/L  |             |               |      |             |     |           | U     |

|                          |     |   |        |       |      |      |  |     |        |  |  |  |
|--------------------------|-----|---|--------|-------|------|------|--|-----|--------|--|--|--|
| <b>LCS (BFJ0727-BS1)</b> |     | Prepared: 25-Oct-2017 Analyzed: 01-Nov-2017 15:17 |        |       |      |      |  |     |        |  |  |  |
| Lead                     | 208 | 28.6  | 0.0680 | 0.100 | ug/L | 25.0 |  | 114 | 80-120 |  |  |  |
| Arsenic                  | 75a | 25.5  | 0.0220 | 0.200 | ug/L | 25.0 |  | 102 | 80-120 |  |  |  |
| Copper                   | 63  | 28.1  | 0.340  | 0.500 | ug/L | 25.0 |  | 113 | 80-120 |  |  |  |
| Copper                   | 65  | 27.7  | 0.350  | 0.500 | ug/L | 25.0 |  | 111 | 80-120 |  |  |  |
| Nickel                   | 60  | 26.7  | 0.0500 | 0.500 | ug/L | 25.0 |  | 107 | 80-120 |  |  |  |
| Nickel                   | 62  | 27.2  | 0.220  | 0.500 | ug/L | 25.0 |  | 109 | 80-120 |  |  |  |

|                                 |     |                           |       |   |      |  |      |  |  |       |    |      |
|---------------------------------|-----|---------------------------|-------|---|------|--|------|--|--|-------|----|------|
| <b>Duplicate (BFJ0727-DUP1)</b> |     | <b>Source: 17J0334-04</b> |       | Prepared: 25-Oct-2017 Analyzed: 03-Nov-2017 19:09 |      |  |      |  |  |       |    |      |
| Lead                            | 208 | 2.67                      | 0.340 | 0.500   | ug/L |  | 2.44 |  |  | 9.21  | 20 | D    |
| Copper                          | 63  | 21.2                      | 1.70  | 2.50  | ug/L |  | 20.9 |  |  | 1.33  | 20 | D    |
| Nickel                          | 60  | 1.48                      | 0.250 | 2.50  | ug/L |  | 1.23 |  |  | 18.50 | 20 | J, D |

|                                   |     |                           |       |   |      |      |      |      |        |  |  |   |
|-----------------------------------|-----|---------------------------|-------|---|------|------|------|------|--------|--|--|---|
| <b>Matrix Spike (BFJ0727-MS1)</b> |     | <b>Source: 17J0334-04</b> |       | Prepared: 25-Oct-2017 Analyzed: 03-Nov-2017 19:18 |      |      |      |      |        |  |  |   |
| Lead                              | 208 | 30.5                      | 0.340 | 0.500   | ug/L | 25.0 | 2.44 | 112  | 75-125 |  |  | D |
| Copper                            | 63  | 45.5                      | 1.70  | 2.50  | ug/L | 25.0 | 20.9 | 98.3 | 75-125 |  |  | D |
| Nickel                            | 60  | 26.3                      | 0.250 | 2.50  | ug/L | 25.0 | 1.23 | 100  | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Reported:  
15-Nov-2017 16:38

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0580 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0580-BLK1)</b> |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 20:57 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0178 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0308 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFJ0580-BS1)</b> |       |        |        |      |       |   |      |        |  |  |   |
|                          |       |        |        |      |       | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 21:16 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.12  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 106  | 80-120 |  |  |   |
| Calcium, Dissolved       | 10.3  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 103  | 80-120 |  |  |   |
| Iron, Dissolved          | 2.23  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 112  | 80-120 |  |  |   |
| Magnesium, Dissolved     | 11.4  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 114  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.548 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 110  | 80-120 |  |  |   |
| Potassium, Dissolved     | 9.41  | 0.0520 | 0.500  | mg/L | 10.0  |   | 94.1 | 80-120 |  |  |   |
| Silicon, Dissolved       | 11.3  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 113  | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.67  | 0.0114 | 0.500  | mg/L | 10.0  |   | 96.7 | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.3  | 1.90   | 50.0   | mg/L | 10.0  |   | 103  | 80-120 |  |  | J |

|                                 |        |        |                    |      |  |   |  |      |    |  |      |
|---------------------------------|--------|--------|--------------------|------|--|---|--|------|----|--|------|
| <b>Duplicate (BFJ0580-DUP1)</b> |        |        |                    |      |  |   |  |      |    |  |      |
|                                 |        |        | Source: 17J0334-01 |      |  | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 21:01 |  |      |    |  |      |
| Aluminum, Dissolved             | ND     | 0.0425 | 0.250              | mg/L |  | ND  |  |      |    |  | U    |
| Calcium, Dissolved              | 3.69   | 0.0255 | 0.250              | mg/L |  | 3.72  |  | 0.80 | 20 |  | D    |
| Iron, Dissolved                 | 3.00   | 0.0065 | 0.250              | mg/L |  | 3.02  |  | 0.78 | 20 |  | D    |
| Magnesium, Dissolved            | 3.25   | 0.0800 | 0.250              | mg/L |  | 3.31  |  | 1.84 | 20 |  | D    |
| Manganese, Dissolved            | 0.0258 | 0.0017 | 0.0050             | mg/L |  | 0.0268  |  | 3.70 | 20 |  | D    |
| Potassium, Dissolved            | 4.50   | 0.260  | 2.50               | mg/L |  | 4.60  |  | 2.18 | 20 |  | D    |
| Silicon, Dissolved              | 33.2   | 0.0260 | 0.300              | mg/L |  | 33.6  |  | 1.39 | 20 |  | D    |
| Sodium, Dissolved               | 242    | 0.0568 | 2.50               | mg/L |  | 246   |  | 1.33 | 20 |  | D    |
| Sodium, Dissolved               | 249    | 9.50   | 250                | mg/L |  | 250   |  | 0.35 | 20 |  | J, D |

|                                   |      |        |                    |      |      |   |     |        |  |  |   |
|-----------------------------------|------|--------|--------------------|------|------|---|-----|--------|--|--|---|
| <b>Matrix Spike (BFJ0580-MS1)</b> |      |        |                    |      |      |   |     |        |  |  |   |
|                                   |      |        | Source: 17J0334-01 |      |      | Prepared: 20-Oct-2017 Analyzed: 27-Oct-2017 21:10 |     |        |  |  |   |
| Aluminum, Dissolved               | 10.5 | 0.0425 | 0.250              | mg/L | 10.0 | ND  | 105 | 75-125 |  |  | D |
| Calcium, Dissolved                | 55.7 | 0.0255 | 0.250              | mg/L | 50.0 | 3.72  | 104 | 75-125 |  |  | D |
| Iron, Dissolved                   | 13.8 | 0.0065 | 0.250              | mg/L | 10.0 | 3.02  | 108 | 75-125 |  |  | D |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 16:38

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0580 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte                 | Detection<br>Result | Detection<br>Limit        | Reporting<br>Limit | Units                 | Spike<br>Level | Source<br>Result            | %REC<br>%REC | %REC<br>Limits | RPD | RPD<br>Limit | Notes |
|-----------------------------------|---------------------|---------------------------|--------------------|-----------------------|----------------|-----------------------------|--------------|----------------|-----|--------------|-------|
| <b>Matrix Spike (BFJ0580-MS1)</b> |                     | <b>Source: 17J0334-01</b> |                    | Prepared: 20-Oct-2017 |                | Analyzed: 27-Oct-2017 21:10 |              |                |     |              |       |
| Magnesium, Dissolved              | 58.8                | 0.0800                    | 0.250              | mg/L                  | 50.0           | 3.31                        | 111          | 75-125         |     |              | D     |
| Manganese, Dissolved              | 2.71                | 0.0017                    | 0.0050             | mg/L                  | 2.50           | 0.0268                      | 107          | 75-125         |     |              | D     |
| Potassium, Dissolved              | 52.3                | 0.260                     | 2.50               | mg/L                  | 50.0           | 4.60                        | 95.5         | 75-125         |     |              | D     |
| Silicon, Dissolved                | 87.1                | 0.0260                    | 0.300              | mg/L                  | 50.0           | 33.6                        | 107          | 75-125         |     |              | D     |
| Sodium, Dissolved                 | 301                 | 0.0568                    | 2.50               | mg/L                  | 50.0           | 246                         | 110          | 75-125         |     |              | D, E  |
| Sodium, Dissolved                 | 306                 | 9.50                      | 250                | mg/L                  | 50.0           | 250                         | 112          | 75-125         |     |              | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0730 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result   | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|----------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0730-BLK1)</b>       |          |                           |       |             |   |      |             |      |           |       |
|                                   |          |                           |       |             | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 15:33 |      |             |      |           |       |
| Mercury, Dissolved                | ND       | 0.000100                  | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0730-BS1)</b>          |          |                           |       |             |   |      |             |      |           |       |
|                                   |          |                           |       |             | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 15:35 |      |             |      |           |       |
| Mercury, Dissolved                | 0.00237  | 0.000100                  | mg/L  | 0.00200     |   | 119  | 80-120      |      |           |       |
| <b>Duplicate (BFJ0730-DUP1)</b>   |          |                           |       |             |   |      |             |      |           |       |
|                                   |          | <b>Source: 17J0334-01</b> |       |             | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 16:13 |      |             |      |           |       |
| Mercury, Dissolved                | 0.000330 | 0.000100                  | mg/L  |             | 0.000330  |      |             | 0.00 |           |       |
| <b>Matrix Spike (BFJ0730-MS1)</b> |          |                           |       |             |   |      |             |      |           |       |
|                                   |          | <b>Source: 17J0334-01</b> |       |             | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 16:15 |      |             |      |           |       |
| Mercury, Dissolved                | 0.00134  | 0.000100                  | mg/L  | 0.00100     | 0.000330  | 101  | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0732 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0732-BLK2)</b> |         |        |                 |                 |       |   |               |      |             |     |           |       |
|                             |         |        |                 |                 |       | Prepared: 25-Oct-2017 Analyzed: 30-Oct-2017 17:17 |               |      |             |     |           |       |
| Arsenic, Dissolved          | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |

|                          |     |      |        |       |      |   |  |      |        |  |  |  |
|--------------------------|-----|------|--------|-------|------|---|--|------|--------|--|--|--|
| <b>LCS (BFJ0732-BS2)</b> |     |      |        |       |      |   |  |      |        |  |  |  |
|                          |     |      |        |       |      | Prepared: 25-Oct-2017 Analyzed: 30-Oct-2017 17:21 |  |      |        |  |  |  |
| Arsenic, Dissolved       | 75a | 24.2 | 0.0220 | 0.200 | ug/L | 25.0  |  | 96.9 | 80-120 |  |  |  |

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0732-BLK1)</b> |         |        |                 |                 |       |   |               |      |             |     |           |       |
|                             |         |        |                 |                 |       | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 13:52 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |

|                          |     |      |        |       |      |   |  |     |        |  |  |  |
|--------------------------|-----|------|--------|-------|------|---|--|-----|--------|--|--|--|
| <b>LCS (BFJ0732-BS1)</b> |     |      |        |       |      |   |  |     |        |  |  |  |
|                          |     |      |        |       |      | Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 14:33 |  |     |        |  |  |  |
| Lead, Dissolved          | 208 | 26.8 | 0.0680 | 0.100 | ug/L | 25.0  |  | 107 | 80-120 |  |  |  |
| Copper, Dissolved        | 63  | 25.6 | 0.340  | 0.500 | ug/L | 25.0  |  | 102 | 80-120 |  |  |  |
| Copper, Dissolved        | 65  | 26.2 | 0.350  | 0.500 | ug/L | 25.0  |  | 105 | 80-120 |  |  |  |
| Nickel, Dissolved        | 60  | 25.1 | 0.0500 | 0.500 | ug/L | 25.0  |  | 101 | 80-120 |  |  |  |
| Nickel, Dissolved        | 62  | 25.2 | 0.220  | 0.500 | ug/L | 25.0  |  | 101 | 80-120 |  |  |  |

|                                 |     |    |      |      |      |  |    |  |  |  |  |   |
|---------------------------------|-----|----|------|------|------|--|----|--|--|--|--|---|
| <b>Duplicate (BFJ0732-DUP1)</b> |     |    |      |      |      |  |    |  |  |  |  |   |
|                                 |     |    |      |      |      | Source: 17J0334-01 Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 16:25 |    |  |  |  |  |   |
| Lead, Dissolved                 | 208 | ND | 1.36 | 2.00 | ug/L |  | ND |  |  |  |  | U |
| Copper, Dissolved               | 63  | ND | 6.80 | 10.0 | ug/L |  | ND |  |  |  |  | U |
| Nickel, Dissolved               | 60  | ND | 1.00 | 10.0 | ug/L |  | ND |  |  |  |  | U |

|                                 |     |       |      |     |      |  |       |  |  |      |    |   |
|---------------------------------|-----|-------|------|-----|------|--|-------|--|--|------|----|---|
| <b>Duplicate (BFJ0732-DUP2)</b> |     |       |      |     |      |  |       |  |  |      |    |   |
|                                 |     |       |      |     |      | Source: 17J0334-01 Prepared: 25-Oct-2017 Analyzed: 01-Nov-2017 20:46 |       |  |  |      |    |   |
| Arsenic, Dissolved              | 75a | 90200 | 22.0 | 200 | ug/L |  | 90900 |  |  | 0.72 | 20 | D |

|                                   |     |      |      |      |      |  |    |      |        |  |  |   |
|-----------------------------------|-----|------|------|------|------|--|----|------|--------|--|--|---|
| <b>Matrix Spike (BFJ0732-MS1)</b> |     |      |      |      |      |  |    |      |        |  |  |   |
|                                   |     |      |      |      |      | Source: 17J0334-01 Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 16:35 |    |      |        |  |  |   |
| Lead, Dissolved                   | 208 | 27.5 | 1.36 | 2.00 | ug/L | 25.0   | ND | 110  | 75-125 |  |  | D |
| Copper, Dissolved                 | 63  | 27.8 | 6.80 | 10.0 | ug/L | 25.0   | ND | 111  | 75-125 |  |  | D |
| Nickel, Dissolved                 | 60  | 24.7 | 1.00 | 10.0 | ug/L | 25.0   | ND | 98.6 | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 16:38

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0732 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte                 | Isotope | Result                    | Detection Limit | Reporting Limit                                   | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-----------------|---|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0732-MS2)</b> |         | <b>Source: 17J0334-01</b> |                 | Prepared: 25-Oct-2017 Analyzed: 01-Nov-2017 20:55 |       |             |               |      |             |     |           |       |
| Arsenic, Dissolved                | 75a     | 92800                     | 22.0            | 200   | ug/L  | 25.0        | 90900         | NR   | 75-125      |     |           | HC, D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

Wet Chemistry - Quality Control

Batch BFJ0590 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte  | Result | Reporting Limit | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|--|--------|-----------------|------------|-------------|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0590-BLK1)</b>  |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:50                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Blank (BFJ0590-BLK2)</b>  |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 15:05                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Bicarbonate  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| Alkalinity, Carbonate  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| Alkalinity, Hydroxide  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| Alkalinity, Total  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Duplicate (BFJ0590-DUP2)</b>                                      |        |                 |            |             |               |      |              |      |           |       |
| Source: 17J0334-01 Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:50 |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | 263    | 1.00            | mg/L CaCO3 |             | 265           |      |              | 0.76 | 20        |       |
| <b>Reference (BFJ0590-SRM1)</b>                                      |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:50                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | 105    | 1.00            | mg/L CaCO3 | 108         |               | 96.8 | 90.37-108.33 |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

Wet Chemistry - Quality Control

Batch BFJ0592 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte           | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|--------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>Blank (BFJ0592-BLK1)</b> |        |                 |        |             |               |   |             |     |           |       |
|                             |        |                 |        |             |               | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 13:12 |             |     |           |       |
| Bromide                     | ND     | 0.100           | mg/L   |             |               |   |             |     |           | U     |
| Chloride                    | ND     | 0.100           | mg/L   |             |               |   |             |     |           | U     |
| Fluoride                    | ND     | 0.100           | mg/L   |             |               |   |             |     |           | U     |
| Nitrate-N                   | ND     | 0.100           | mg-N/L |             |               |   |             |     |           | U     |
| Nitrite-N                   | ND     | 0.100           | mg-N/L |             |               |   |             |     |           | U     |
| Orthophosphorus             | ND     | 0.10            | mg-P/L |             |               |   |             |     |           | U     |
| Sulfate                     | ND     | 0.100           | mg/L   |             |               |   |             |     |           | U     |

|                          |      |       |        |      |  |   |        |  |  |  |
|--------------------------|------|-------|--------|------|--|---|--------|--|--|--|
| <b>LCS (BFJ0592-BS1)</b> |      |       |        |      |  |   |        |  |  |  |
|                          |      |       |        |      |  | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 13:32 |        |  |  |  |
| Bromide                  | 1.48 | 0.100 | mg/L   | 1.50 |  | 98.5  | 90-110 |  |  |  |
| Chloride                 | 1.51 | 0.100 | mg/L   | 1.50 |  | 100   | 90-110 |  |  |  |
| Fluoride                 | 1.53 | 0.100 | mg/L   | 1.50 |  | 102   | 90-110 |  |  |  |
| Nitrate-N                | 1.54 | 0.100 | mg-N/L | 1.50 |  | 102   | 90-110 |  |  |  |
| Nitrite-N                | 1.54 | 0.100 | mg-N/L | 1.50 |  | 102   | 90-110 |  |  |  |
| Orthophosphorus          | 1.50 | 0.10  | mg-P/L | 1.50 |  | 100   | 90-110 |  |  |  |
| Sulfate                  | 1.53 | 0.100 | mg/L   | 1.50 |  | 102   | 90-110 |  |  |  |





Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 16:38

**Wet Chemistry - Quality Control**

**Batch BFJ0625 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0625-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 21-Oct-2017 Analyzed: 21-Oct-2017 13:55 |      |             |      |           |       |
| Dissolved Solids                | ND     | 0.5                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0625-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 21-Oct-2017 Analyzed: 21-Oct-2017 13:55 |      |             |      |           |       |
| Dissolved Solids                | 490    | 1.0                       | mg/L  | 500         |   | 98.0 | 90-110      |      |           |       |
| <b>Duplicate (BFJ0625-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17J0334-01</b> |       |             | Prepared: 21-Oct-2017 Analyzed: 21-Oct-2017 13:55 |      |             |      |           |       |
| Dissolved Solids                | 814    | 1.0                       | mg/L  |             | 787   |      |             | 3.37 | 20        |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

Wet Chemistry - Quality Control

Batch BFJ0656 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: GM

| QC Sample/Analyte                   | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-------------------------------------|--------|---|-------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0656-BLK2)</b>         |        | Prepared: 23-Oct-2017 Analyzed: 09-Nov-2017 14:29 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50  | mg/L  |   |               |      |             |      |           | U     |
| <b>LCS (BFJ0656-BS2)</b>            |        | Prepared: 23-Oct-2017 Analyzed: 09-Nov-2017 14:49 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 19.2   | 0.50  | mg/L  | 20.0  |               | 96.2 | 90-110      |      |           |       |
| <b>Duplicate (BFJ0656-DUP3)</b>     |        | <b>Source: 17J0334-02RE2</b>                      |       | Prepared: 23-Oct-2017 Analyzed: 13-Nov-2017 20:04 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 10.3   | 1.00  | mg/L  |   | 10.0          |      |             | 2.07 | 20        | D     |
| <b>Matrix Spike (BFJ0656-MS3)</b>   |        | <b>Source: 17J0334-02RE2</b>                      |       | Prepared: 23-Oct-2017 Analyzed: 13-Nov-2017 20:26 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 54.7   | 1.00  | mg/L  | 40.0  | 10.0          | 112  | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 16:38

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 16:38

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
15-Nov-2017 16:38

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



15 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

17J0344

Associated SDG ID(s)

N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-635-6200 206-695-6201 (fax)



Date: 10/17/17  
 Page: 1 of 3  
 No. of Coolers: \_\_\_\_\_  
 Cooler Temps: \_\_\_\_\_

Turn-around Requested: Normal  
 ARI Assigned Number: 17J0344  
 ARI Client Company: Pioneer Technologies  
 Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: D Cooper 206-660-3466  
T Dreher / L Kerner / D Pickering

| Sample ID  | Date  | Time | Matrix | No. Containers | Analysis Requested   |  |  |   |  |  |                                      |                            |   |   | Notes/Comments |  |
|--|---|------|--------|----------------|--|--|--|---|--|--|--------------------------------------|----------------------------|---|---|----------------|--|
|  |   |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A  | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6910C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide, Nitrate,<br>Chloride, Fluoride, Nitrate,<br>EPA 300.0    | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |   |   |                |  |
| GW-5031-101717   | 10/17/17  | 1400 | water  | 4              | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X | MS/MSD         |  |
| GW-5131-101717-(20)  |   | 1400 |        | 4              | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X | MS/MSD         |  |
| GW-5182-101717-(20)  |   | 1410 |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| GW-5188-2-101717   |   | 1410 |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| GW-562-1-101817  | 10/18/17  | 855  |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| GW-562-1-101817-(20)   |   | 855  |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| GW-411-1-101817  |   | 900  |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| GW-411-1-101817-(20)   |   | 900  |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| GW-461-2-101817  |   | 1025 |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| GW-461-2-101817-(20)   |   | 1025 |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| GW-5E1-1-101817  |   | 1030 |        |                | X  | X  | X  | X   | X  | X  | X                                    | X                          | X   | X |                |  |
| Comments/Special Instructions  | Relinquished by (Signature) <u>L/K</u><br>Printed Name: <u>L/K</u><br>Company: _____<br>Date & Time: _____                                |      |        |                | Received by (Signature) <u>L/K</u><br>Printed Name: <u>L/K</u><br>Company: _____<br>Date & Time: _____ |  |  |   | Relinquished by (Signature) <u>L/K</u><br>Printed Name: <u>L/K</u><br>Company: _____<br>Date & Time: _____ |  |                                      |                            | Received by (Signature) <u>Brandon Fisk</u><br>Printed Name: <u>Brandon Fisk</u><br>Company: <u>ARI</u><br>Date & Time: <u>10/19/17 12:10</u> |   |                |  |
| Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by (Signature) <u>Teal Dreher</u><br>Printed Name: <u>Teal Dreher</u><br>Company: <u>DOF</u><br>Date & Time: <u>10/18/17</u> |      |        |                | Received by (Signature) <u>L/K</u><br>Printed Name: <u>L/K</u><br>Company: _____<br>Date & Time: _____ |  |  |   | Relinquished by (Signature) <u>L/K</u><br>Printed Name: <u>L/K</u><br>Company: _____<br>Date & Time: _____ |  |                                      |                            | Received by (Signature) <u>Brandon Fisk</u><br>Printed Name: <u>Brandon Fisk</u><br>Company: <u>ARI</u><br>Date & Time: <u>10/19/17 12:10</u> |   |                |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under P-SDDA/PSEP/PSMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17J0344**  
 ARI Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**

Turn-around Requested: **Normal**  
 Date: **10/18/17**  
 Page: **2** of **3**  
 No. of Coolers: **2**  
 Cooler Temps: **3**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID  | Date     | Time | Matrix | No. Containers | Analysis Requested                          |  |  |   |   |  |                                      |                            | Notes/Comments |   |
|--|----------|------|--------|----------------|---|--|--|---|---|--|--------------------------------------|----------------------------|----------------|---|
|  |          |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 8010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide, Nitrate,<br>Chloride, Fluoride, Nitrate,<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |                |   |
| GW-5E1-1-101817-(20)   | 10/18/17 | 1030 | Water  | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              | All dissolved samples field filtered 0.45µm |
| GW-5F1-1-101817  |          | 1130 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| GW-5F1-1-101817-(20)   |          | 1130 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| GW-5E8-1-101817  |          | 1145 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| GW-5E8-1-101817-(20)   |          | 1145 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| EB-101717  | 10/17/17 | 1500 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| EB-101717-(20)   |          | 1500 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| GW-5E1-2-101817  | 10/18/17 | 1305 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| GW-5E1-2-101817-(20)   |          | 1305 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| EB-101818  |          | 1400 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| EB-101818-(20)   |          | 1400 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X              |   |
| Comments/Special Instructions  |          |      |        |                |   |  |  |   |   |  |                                      |                            |                |   |
| submit EDD to PIONEER using PIONEER EDD format bill to Port of Tacoma PO#79227 |          |      |        |                |   |  |  |   |   |  |                                      |                            |                |   |

Relinquished by (Signature): *Lyle Kone*  
 Printed Name: **Lyle Kone**  
 Company: **DOF**  
 Date & Time: **10/19/17 12:10**

Received by (Signature): *Lyle Kone*  
 Printed Name: **Lyle Kone**  
 Company: **DOF**  
 Date & Time: **10/19/17 12:10**

Relinquished by (Signature): *Lyle Kone*  
 Printed Name: **Lyle Kone**  
 Company: **DOF**  
 Date & Time: **10/19/17 11:30**

Received by (Signature): *Lyle Kone*  
 Printed Name: **Lyle Kone**  
 Company: **DOF**  
 Date & Time: **10/19/17 11:30**

Relinquished by (Signature): *Teal Dreher*  
 Printed Name: **Teal Dreher**  
 Company: **DOF**  
 Date & Time: **10/18/17**

Received by (Signature): *Teal Dreher*  
 Printed Name: **Teal Dreher**  
 Company: **DOF**  
 Date & Time: **10/18/17**

Relinquished by (Signature): *Brandon Fisk*  
 Printed Name: **Brandon Fisk**  
 Company: **ARI**  
 Date & Time: **10/19/17 12:10**

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

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# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17J0344**  
 ARI Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**



Turn-around Requested: **Normal**  
 Date: **10/18/17**  
 Page: **3** of **3**  
 No. of Coolers: **3**  
 Cooler Temps:

Samplers: **D Cooper 206-860-3466**  
**T Dreher / L Kerner / D Pickering**

| Sample ID             | Date     | Time | Matrix | No Containers | Analysis Requested                          |   |                       |                                       |  |  |   |                                      |                            |   | Notes/Comments |   |
|-----------------------|----------|------|--------|---------------|---|---|-----------------------|---------------------------------------|--|--|---|--------------------------------------|----------------------------|---|----------------|---|
|                       |          |      |        |               | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate<br>EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |   |                |   |
| GW-4F1-2-101817       | 10/18/17 | 1300 | Water  | 4             | X   | X   | X                     | X                                     | X  | X  | X   | X                                    | X                          | X | X              | All dissolved samples field filtered 0.45uM |
| GW-4F1-2-101817-(20)  | 1300     | 1300 | Water  | 1             | X   | X   | X                     | X                                     | X  | X  | X   | X                                    | X                          | X | X              |   |
| GW-4F1-2-101817-(001) | 1305     | 1305 | Water  | 1             | X   | X   | X                     | X                                     | X  | X  | X   | X                                    | X                          | X | X              |   |
| GW-4F1-2-101817-(21)  | 1305     | 1305 | Water  | 1             | X   | X   | X                     | X                                     | X  | X  | X   | X                                    | X                          | X | X              |   |

Relinquished by: **Luke Kerner** (Signature) **Luke Kerner** (Printed Name) **DOF** (Company) **10/19/17** (Date & Time)  
 Received by: **Luke Kerner** (Signature) **Luke Kerner** (Printed Name) **DOF** (Company) **10/19/17** (Date & Time)

Relinquished by: **Teal Dreher** (Signature) **Teal Dreher** (Printed Name) **POF** (Company) **10/19/17** (Date & Time)  
 Received by: **Brandon Fisk** (Signature) **Brandon Fisk** (Printed Name) **ARI** (Company) **10/19/17** (Date & Time)

Comments/Special Instructions: **Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227**

imits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under P-SDDA/PSEP/ISMS protocol will be stored frozen for up to one year and then discarded.





WORK ORDER

17J0344

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                    | pH                         |
|--------------|-----------------------------------|----------------------------|
| 17J0344-01 A | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-01 B | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-01 C | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-01 D | HDPE NM, 1000 mL, 1:1 HNO3        | < 2 P                      |
| 17J0344-02 A | Small OJ, 500 mL                  |                            |
| 17J0344-02 B | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 P                      |
| 17J0344-02 C | Large OJ, 1000 mL                 |                            |
| 17J0344-02 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 P                      |
| 17J0344-03 A | Large OJ, 1000 mL                 |                            |
| 17J0344-03 B | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 P                      |
| 17J0344-03 C | Large OJ, 1000 mL                 |                            |
| 17J0344-03 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 P                      |
| 17J0344-04 A | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-04 B | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-04 C | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-04 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 P                      |
| 17J0344-05 A | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-05 B | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-05 C | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-05 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 P                      |
| 17J0344-06 A | Large OJ, 1000 mL                 |                            |
| 17J0344-06 B | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 P                      |
| 17J0344-06 C | Small OJ, 500 mL                  |                            |
| 17J0344-06 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | BF <del>&lt; 2</del> < 2 P |
| 17J0344-07 A | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-07 B | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-07 C | VOA Vial, Amber, 40 mL, HCL       |                            |
| 17J0344-07 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 fail                   |
| 17J0344-08 A | Large OJ, 1000 mL                 |                            |
| 17J0344-08 B | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 P                      |
| 17J0344-08 C | Small OJ, 500 mL                  |                            |

P=pass



WORK ORDER

17J0344

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

|              |                                   |    |      |
|--------------|-----------------------------------|----|------|
| 17J0344-08 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | 72 | fail |
| 17J0344-09 A | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-09 B | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-09 C | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-09 D | HDPE NM, 500 mL, 1:1 HNO3         | 72 | fail |
| 17J0344-10 A | Large OJ, 1000 mL                 |    |      |
| 17J0344-10 B | Glass NM, Amber, 250 mL, 9N H2SO4 |    |      |
| 17J0344-10 C | Small OJ, 500 mL                  |    |      |
| 17J0344-10 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | 72 | fail |
| 17J0344-11 A | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-11 B | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-11 C | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-11 D | HDPE NM, 500 mL, 1:1 HNO3         | 22 | P    |
| 17J0344-12 A | Large OJ, 1000 mL                 |    |      |
| 17J0344-12 B | Glass NM, Amber, 1000 mL          |    |      |
| 17J0344-12 C | Small OJ, 500 mL                  |    |      |
| 17J0344-12 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | P    |
| 17J0344-13 A | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-13 B | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-13 C | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-13 D | HDPE NM, 500 mL, 1:1 HNO3         | <2 | P    |
| 17J0344-14 A | Large OJ, 1000 mL                 |    |      |
| 17J0344-14 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | P    |
| 17J0344-14 C | Small OJ, 500 mL                  |    |      |
| 17J0344-14 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | P    |
| 17J0344-15 A | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-15 B | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-15 C | VOA Vial, Amber, 40 mL, HCL       |    |      |
| 17J0344-15 D | HDPE NM, 500 mL, 1:1 HNO3         | <2 | P    |
| 17J0344-16 A | Large OJ, 1000 mL                 |    |      |
| 17J0344-16 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | P    |
| 17J0344-16 C | Small OJ, 500 mL                  |    |      |
| 17J0344-16 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | P    |
| 17J0344-17 A | VOA Vial, Amber, 40 mL, HCL       |    |      |

P = pass





WORK ORDER

17J0344

|  |                                   |  |
|--|-----------------------------------|--|
| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |
| 17J0344-17 B   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-17 C   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-17 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2 p   |
| 17J0344-18 A   | Large OJ, 1000 mL                 |  |
| 17J0344-18 B   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 p   |
| 17J0344-18 C   | Small OJ, 500 mL                  |  |
| 17J0344-18 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 p   |
| 17J0344-19 A   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-19 B   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-19 C   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-19 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2 p   |
| 17J0344-20 A   | Large OJ, 1000 mL                 |  |
| 17J0344-20 B   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 p   |
| 17J0344-20 C   | Small OJ, 500 mL                  |  |
| 17J0344-20 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2 fail  |
| 17J0344-21 A   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-21 B   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-21 C   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-21 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2 p   |
| 17J0344-22 A   | Large OJ, 1000 mL                 |  |
| 17J0344-22 B   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 p   |
| 17J0344-22 C   | Small OJ, 500 mL                  |  |
| 17J0344-22 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 p   |
| 17J0344-23 A   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-23 B   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-23 C   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-23 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2 fail  |
| 17J0344-24 A   | Large OJ, 1000 mL                 |  |
| 17J0344-24 B   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 p   |
| 17J0344-24 C   | Small OJ, 500 mL                  |  |
| 17J0344-24 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2 fail  |
| 17J0344-25 A   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-25 B   | VOA Vial, Amber, 40 mL, HCL       |  |
| 17J0344-25 C   | VOA Vial, Amber, 40 mL, HCL       |  |

p= pass



WORK ORDER

17J0344

|  |                                   |  |      |
|--|-----------------------------------|--|------|
| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |      |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |      |
| 17J0344-25 D   | HDPE NM, 500 mL, 1:1 HNO3         | 22   | P    |
| 17J0344-26 A   | Large OJ, 1000 mL                 |  |      |
| 17J0344-26 B   | Glass NM, Amber, 250 mL, 9N H2SO4 | 2  | P    |
| 17J0344-26 C   | Small OJ, 500 mL                  |  |      |
| 17J0344-26 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | 22   | fail |
| 17J0344-27 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0344-27 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0344-27 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0344-27 D   | VOA Vial, Clear, 40 mL, HCL       |  |      |

P=PASS

BF

10/20/17

Preservation Confirmed By \_\_\_\_\_

Date \_\_\_\_\_





# Cooler Receipt Form

ARI Client: Pioneer Tech.

Project Name: Arkema

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: \_\_\_\_\_

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO

Were custody papers included with the cooler? ..... YES YES NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 1 2

Time: 4.3 5.5

If cooler temperature is out of compliance fill out form 00070F 3.4 BF 10/19/17 Temp Gun ID#: D002565

Cooler Accepted by: BF Date: 10/19/17 Time: 1210

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES NO

Were all bottles sealed in individual plastic bags? ..... YES NO

Did all bottles arrive in good condition (unbroken)? ..... YES NO

Were all bottle labels complete and legible? ..... YES NO

Did the number of containers listed on COC match with the number of containers received? ..... YES NO

Did all bottle labels and tags agree with custody papers? ..... YES NO BF 10/20/17

Were all bottles used correct for the requested analyses? ..... YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? ..... NA YES NO

Was sufficient amount of sample sent in each bottle? ..... YES NO

Date VOC Trip Blank was made at ARI ..... YES NO

Was Sample Split by ARI : NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: BF Date: 10/20/17 Time: \_\_\_\_\_

**\*\* Notify Project Manager of discrepancies or concerns \*\***


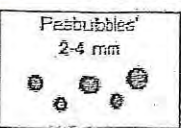
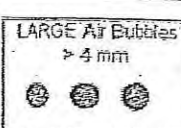
| Sample ID on Bottle | Sample ID on COC  | Sample ID on Bottle | Sample ID on COC |
|---------------------|-------------------|---------------------|------------------|
| <u>GW-5FI-2000</u>  | <u>GW-4FI-100</u> |                     |                  |
|                     |                   |                     |                  |
|                     |                   |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

MISSING 5 TDS-2's alkalinity  
coc missing Tbs BF 10/20/17

VOA vials  
coc says missing ... (21)  
samples GW-4FI-2000 (21)

By: BF Date: \_\_\_\_\_

|   |   |   |                                 |
|---|---|---|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|   |   |   | Peabubbles → "pb" (2 to < 4 mm) |
|   |   |   | Large → "lg" (4 to < 6 mm)      |
|   |   |   | Headspace → "hs" (> 6 mm)       |



17J0344-01 A - 1 pea bubble

VOA Vials with  
Air bubbles

17J0344-04 A - 1 large air bubble

17J0344-04 B - 2 large air bubbles

17J0344-04 C - 2 large air bubbles

17J0344-05 A - 1 large air bubble

17J0344-05 B - 1 large air bubble

17J0344-05 C - 1 large air bubble

17J0344-09 A - 10 small air bubbles

17J0344-09 B - 7 pea bubbles

17J0344-09 C - 9 small air bubbles

17J0344-13 A - 1 pea bubble

17J0344-13 B - 1 large air bubble

17J0344-13 C - 2 pea bubbles

17J0344-21 B - 3 pea bubbles

17J0344-21 C - 1 pea bubble

17J0344-23 A - 1 large air bubble

17J0344-25 A - 1 large air bubble

17J0344-25 B - 4 pea bubbles

17J0344-25 C - 1 large air bubble

verified by:

JBL *[Signature]*

Date:

10/20/2017



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID             | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-----------------------|---------------|--------|-------------------|-------------------|
| GW-5C13-1-101717      | 17J0344-01    | Water  | 17-Oct-2017 14:00 | 19-Oct-2017 12:10 |
| GW-5C13-1-101717-(20) | 17J0344-02    | Water  | 17-Oct-2017 14:00 | 19-Oct-2017 12:10 |
| GW-5D8-2-101717-(20)  | 17J0344-03    | Water  | 17-Oct-2017 14:10 | 19-Oct-2017 12:10 |
| GW-5D8-2-101717       | 17J0344-04    | Water  | 17-Oct-2017 14:10 | 19-Oct-2017 12:10 |
| GW-5E2-1-101817       | 17J0344-05    | Water  | 18-Oct-2017 08:55 | 19-Oct-2017 12:10 |
| GW-5E2-1-101817-(20)  | 17J0344-06    | Water  | 18-Oct-2017 08:55 | 19-Oct-2017 12:10 |
| GW-4D1-1-101817       | 17J0344-07    | Water  | 18-Oct-2017 09:00 | 19-Oct-2017 12:10 |
| GW-4D1-1-101817-(20)  | 17J0344-08    | Water  | 18-Oct-2017 09:00 | 19-Oct-2017 12:10 |
| GW-4E1-2-101817       | 17J0344-09    | Water  | 18-Oct-2017 10:25 | 19-Oct-2017 12:10 |
| GW-4E1-2-101817-(20)  | 17J0344-10    | Water  | 18-Oct-2017 10:25 | 19-Oct-2017 12:10 |
| GW-5E1-1-101817       | 17J0344-11    | Water  | 18-Oct-2017 10:30 | 19-Oct-2017 12:10 |
| GW-5E1-1-101817-(20)  | 17J0344-12    | Water  | 18-Oct-2017 10:30 | 19-Oct-2017 12:10 |
| GW-5F1-1-101817       | 17J0344-13    | Water  | 18-Oct-2017 11:30 | 19-Oct-2017 12:10 |
| GW-5F1-1-101817-(20)  | 17J0344-14    | Water  | 18-Oct-2017 11:30 | 19-Oct-2017 12:10 |
| GW-5E8-1-101817       | 17J0344-15    | Water  | 18-Oct-2017 11:45 | 19-Oct-2017 12:10 |
| GW-5E8-1-101817-(20)  | 17J0344-16    | Water  | 18-Oct-2017 11:45 | 19-Oct-2017 12:10 |
| EB-101717             | 17J0344-17    | Water  | 17-Oct-2017 15:00 | 19-Oct-2017 12:10 |
| EB-101717-(20)        | 17J0344-18    | Water  | 17-Oct-2017 15:00 | 19-Oct-2017 12:10 |
| GW-5E1-2-101817       | 17J0344-19    | Water  | 18-Oct-2017 13:05 | 19-Oct-2017 12:10 |
| GW-5E1-2-101817-(20)  | 17J0344-20    | Water  | 18-Oct-2017 13:05 | 19-Oct-2017 12:10 |
| EB-101817             | 17J0344-21    | Water  | 18-Oct-2017 14:00 | 19-Oct-2017 12:10 |
| EB-101817-(20)        | 17J0344-22    | Water  | 18-Oct-2017 14:00 | 19-Oct-2017 12:10 |
| GW-4F1-2-101817       | 17J0344-23    | Water  | 18-Oct-2017 13:00 | 19-Oct-2017 12:10 |
| GW-4F1-2-101817-(20)  | 17J0344-24    | Water  | 18-Oct-2017 13:00 | 19-Oct-2017 12:10 |
| GW-4F1-2-101817-(01)  | 17J0344-25    | Water  | 18-Oct-2017 13:05 | 19-Oct-2017 12:10 |
| GW-4F1-2-101817-(21)  | 17J0344-26    | Water  | 18-Oct-2017 13:05 | 19-Oct-2017 12:10 |
| TB                    | 17J0344-27    | Water  | 16-Oct-2017 00:00 | 19-Oct-2017 12:10 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 19, 2017 under ARI workorder 17J0344. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

Method blank BFJ0771 has Tetrachloroethene detected below the reporting limit, but above the method detection limit. This analyte has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5C13-1-101717. The matrix spike percent recovery was within QC limits. The duplicate has a Mercury concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to +/- the reporting limit instead of 20% of the RPD. This is likely due to matrix interference. The Mercury has been flagged with an "L" qualifier on the duplicate. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-5C13-1-101717-(20). The matrix spike percent recovery was within QC limits. The duplicate has a Mercury concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to +/- the reporting limit instead of 20% of the RPD. This is likely due to matrix interference. The Mercury has been flagged with an "L" qualifier on the duplicate. No further corrective action was taken.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

Initial and continuing calibrations were within method requirements.

Method blank BFJ0761 has Arsenic detected below the reporting limit, but above the method detection limit. The Arsenic has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5C13-1-101717. The duplicate has a Copper concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. The Copper has been flagged with an "L" qualifier on the duplicate. The matrix spike has a natural concentration of Arsenic that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Arsenic has been flagged with an "HC" qualifier on the matrix spike. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-5C13-1-101717-(20). The duplicate RPD were within QC limits. The matrix spike has a natural concentration of Arsenic that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Arsenic has been flagged with an "HC" qualifier on the matrix spike. No further corrective action was taken.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFJ0881 has Sodium and Iron detected below the reporting limits, but above the method detection limits. The Sodium and Iron have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5C13-1-101717-(20). The matrix spike and duplicate have a Sodium concentration that exceeds the upper calibration range. The Sodium has been flagged with an "E" qualifier. The matrix spike has a natural concentration of Potassium that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Sodium has been flagged with an "HC" qualifier on the matrix spike. This is likely due to matrix interference. No further corrective action was taken.

#### **Anions - EPA Method 300.0**

Samples GW-5C13-1-101717-(20), GW-5D8-2-101717-(20) and EB-101717-(20) were analyzed outside of holding due to the amount of holding time left after receipt. The O-phos reanalysis was analyzed outside of the recommended holding time due to hold time left during the dilution process. The samples analyzed outside of the 48 hour recommended holding time have been flagged with an "H" qualifier.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5D8-2-101717-(20). The matrix spike has low spike recovery for Fluoride, Nitrite and O-phos. The QC was reanalyzed to confirm concentrations, and both sets of QC were reported. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-5C13-1-101717-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

#### **Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample GW-5C13-1-101717-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5C13-1-101717**  
**17J0344-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/17/2017 14:00  
Analyzed: 23-Oct-2017 17:25

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>1.87</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.27</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 110   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 91.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717**  
**17J0344-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/17/2017 14:00  
Analyzed: 02-Nov-2017 13:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>1.56</b> | ug/L  | D     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717**  
**17J0344-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/17/2017 14:00  
Analyzed: 31-Oct-2017 18:40

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1960</b> | ug/L  | D     |

Instrument: ICPMS2

Analyzed: 01-Nov-2017 21:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>2.14</b> | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>5.05</b> | ug/L  | D     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717**  
**17J0344-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 14:00  
Analyzed: 02-Nov-2017 13:08

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 14:00  
Analyzed: 02-Nov-2017 16:33

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0843</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>5.54</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>2.84</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>4.95</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0152</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>34.2</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>56.0</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>1450</b>   | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 14:00  
Analyzed: 03-Nov-2017 20:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 10       | 0.680           | 1.00            | <b>1.07</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 14:00  
Analyzed: 03-Nov-2017 20:47

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>1640</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 10       | 3.40            | 5.00            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>3.67</b> | ug/L  | J, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 14:00  
Analyzed: 27-Oct-2017 16:42

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765  
Prepared: 26-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 14:00  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 20 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>3800</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 14:00  
Analyzed: 20-Oct-2017 13:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>1.11</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.04</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | H, U  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/17/2017 14:00  
Analyzed: 20-Oct-2017 10:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0590  
Prepared: 20-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 744    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 143    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 887    | mg/L CaCO3 |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 14:00  
Analyzed: 04-Nov-2017 23:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>18.2</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 14:00  
Analyzed: 20-Oct-2017 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>8.88</b> | mg-P/L | H, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 14:00  
Analyzed: 21-Oct-2017 21:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>162</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5C13-1-101717-(20)**  
**17J0344-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 14:00  
Analyzed: 22-Oct-2017 04:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0592 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1410</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 14:10  
Analyzed: 01-Nov-2017 18:49

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | 117    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | 16.3   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | 294    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | 0.994  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | 210    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | 22.4   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | 4940   | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/17/2017 14:10  
Analyzed: 02-Nov-2017 15:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/17/2017 14:10  
Analyzed: 02-Nov-2017 15:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2.92</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 14:10  
Analyzed: 27-Oct-2017 16:47

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 14:10  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 5 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>13000</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 14:10  
Analyzed: 20-Oct-2017 04:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.193</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | H, U  |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/17/2017 14:10  
Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734 Sample Size: 100 mL  
Prepared: 25-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1310</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1310</b> | mg/L CaCO3 |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 14:10  
Analyzed: 05-Nov-2017 00:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>21.9</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 14:10  
Analyzed: 21-Oct-2017 17:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>9.16</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>49.6</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717-(20)**  
**17J0344-03RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 14:10  
Analyzed: 21-Oct-2017 23:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>7580</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717**  
**17J0344-04 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/17/2017 14:10  
Analyzed: 23-Oct-2017 17:45

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.28</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.21</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 117   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106   | %     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717**  
**17J0344-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/17/2017 14:10  
Analyzed: 31-Oct-2017 18:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |





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**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717**  
**17J0344-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/17/2017 14:10  
Analyzed: 31-Oct-2017 18:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2.72</b> | ug/L  | J, D  |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5D8-2-101717**  
**17J0344-04 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 14:10  
Analyzed: 02-Nov-2017 13:12

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5E2-1-101817**  
**17J0344-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 08:55  
Analyzed: 23-Oct-2017 18:05

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 109   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 90.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 106   | %     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817**  
**17J0344-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 08:55  
Analyzed: 31-Oct-2017 19:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>3.48</b> | ug/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817**  
**17J0344-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 08:55  
Analyzed: 31-Oct-2017 19:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>431</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>17.6</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>4.34</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817**  
**17J0344-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 08:55  
Analyzed: 02-Nov-2017 13:14

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 08:55  
Analyzed: 01-Nov-2017 20:14

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.809</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>13.1</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>4.58</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>4.05</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.138</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>11.6</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>25.2</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>580</b>   | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/18/2017 08:55  
Analyzed: 03-Nov-2017 22:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | <b>1.03</b> | ug/L  | D     |





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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 08:55  
Analyzed: 02-Nov-2017 16:18

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>353</b> | ug/L  | D     |

Instrument: ICPMS2 Analyzed: 03-Nov-2017 22:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 5        | 1.70            | 2.50            | <b>3.05</b> | ug/L  | D     |
| Nickel, Dissolved | 7440-02-0  | 5        | 0.250           | 2.50            | <b>1.56</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 08:55  
Analyzed: 27-Oct-2017 16:49

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000100</b> | mg/L  |       |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 08:55  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 50 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1590</b> | mg/L  |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 08:55  
Analyzed: 20-Oct-2017 05:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.385</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.64</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/18/2017 08:55  
Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 394    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 394    | mg/L CaCO3 |       |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 08:55  
Analyzed: 05-Nov-2017 01:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>70.6</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 08:55  
Analyzed: 20-Oct-2017 12:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 0.20            | <b>2.97</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2        | 0.200           | <b>3.71</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E2-1-101817-(20)**  
**17J0344-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 08:55  
Analyzed: 22-Oct-2017 01:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>577</b> | mg/L  | D     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
15-Nov-2017 17:35

**GW-4D1-1-101817**  
**17J0344-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 09:00  
Analyzed: 23-Oct-2017 18:26

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.32</b> | ug/L   | M     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.12</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 107 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.5 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 95.7 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101 %  |       |



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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817**  
**17J0344-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 09:00  
Analyzed: 31-Oct-2017 19:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | 74.7   | ug/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817**  
**17J0344-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 09:00  
Analyzed: 31-Oct-2017 19:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>4620</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>175</b>  | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>99.1</b> | ug/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817**  
**17J0344-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 09:00  
Analyzed: 02-Nov-2017 13:16

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 10 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 09:00  
Analyzed: 01-Nov-2017 18:42

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | <b>0.106</b>  | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>3.27</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>1.19</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>0.141</b>  | mg/L  | J, D  |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>0.0101</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>79.1</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>248</b>    | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>3190</b>   | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 09:00  
Analyzed: 02-Nov-2017 16:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>75.8</b> | ug/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 09:00  
Analyzed: 02-Nov-2017 16:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>4690</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>183</b>  | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>109</b>  | ug/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 09:00  
Analyzed: 27-Oct-2017 16:50

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000170</b> | mg/L  |       |





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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 09:00  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 5 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>8240</b> | mg/L  |       |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 09:00  
Analyzed: 20-Oct-2017 06:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | 3.76   | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 2        | 0.200           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 2        | 0.200           | ND     | mg-N/L | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/18/2017 09:00

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-----------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>2820</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | <b>787</b> | mg/L CaCO3 |       |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>3610</b> | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 09:00  
Analyzed: 05-Nov-2017 01:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 7.476    | 3.74            | <b>259</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 09:00  
Analyzed: 20-Oct-2017 12:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>8.38</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>6.85</b> | mg-P/L | H, D  |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 09:00  
Analyzed: 22-Oct-2017 01:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>108</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4D1-1-101817-(20)**  
**17J0344-08RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 09:00  
Analyzed: 25-Oct-2017 20:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>2080</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-4E1-2-101817**  
**17J0344-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 10:25  
Analyzed: 23-Oct-2017 18:46

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 125   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 91.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 106   | %     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817**  
**17J0344-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 10:25  
Analyzed: 31-Oct-2017 18:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817**  
**17J0344-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 10:25  
Analyzed: 31-Oct-2017 18:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>4.20</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817**  
**17J0344-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 10:25  
Analyzed: 02-Nov-2017 13:22

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 10:25  
Analyzed: 01-Nov-2017 18:37

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | 241    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | 2.81   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | 676    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | 0.711  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | 269    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | 20.5   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | 6330   | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 10:25  
Analyzed: 02-Nov-2017 16:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 10:25  
Analyzed: 02-Nov-2017 16:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3.00</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 10:25  
Analyzed: 27-Oct-2017 16:52

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 10:25  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 5 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>18000</b> | mg/L  |       |





Pioneer Technologies Corporation  
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Reported:  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 10:25  
Analyzed: 20-Oct-2017 06:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.06</b> | mg-P/L |       |



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Reported:  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/18/2017 10:25

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>3030</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>3030</b> | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 10:25  
Analyzed: 21-Oct-2017 18:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>13.3</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 10:25  
Analyzed: 22-Oct-2017 01:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>9130</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10RE2 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 10:25  
Analyzed: 13-Nov-2017 21:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>42.7</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4E1-2-101817-(20)**  
**17J0344-10RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 10:25  
Analyzed: 25-Oct-2017 20:40

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>137</b> | mg/L  | D     |



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Reported:  
15-Nov-2017 17:35

**GW-5E1-1-101817**  
**17J0344-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 10:30  
Analyzed: 23-Oct-2017 19:06

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 112   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.7  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 86.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102   | %     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817**  
**17J0344-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 10:30  
Analyzed: 02-Nov-2017 13:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |





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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817**  
**17J0344-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 10:30  
Analyzed: 31-Oct-2017 18:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>645</b> | ug/L  | D     |

Instrument: ICPMS2

Analyzed: 01-Nov-2017 20:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>1.55</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817**  
**17J0344-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 10:30  
Analyzed: 02-Nov-2017 13:23

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 10:30  
Analyzed: 01-Nov-2017 20:06

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881 Sample Size: 25 mL  
Prepared: 31-Oct-2017 Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 29.4   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 39.9   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 9.09   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 0.297  | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 7.56   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 41.8   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | 46.1   | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/18/2017 10:30  
Analyzed: 03-Nov-2017 22:27

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 10:30  
Analyzed: 02-Nov-2017 16:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>671</b> | ug/L  | D     |

Instrument: ICPMS2 Analyzed: 03-Nov-2017 22:27

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 2        | 0.680           | 1.00            | ND           | ug/L  | U     |
| Nickel, Dissolved | 7440-02-0  | 2        | 0.100           | 1.00            | <b>0.898</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 10:30  
Analyzed: 27-Oct-2017 16:57

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765  
Prepared: 26-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 10:30  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 100 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>326</b> | mg/L  |       |



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Reported:  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 10:30  
Analyzed: 20-Oct-2017 06:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.193</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.373</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |





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Reported:  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/18/2017 10:30  
Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 208    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 208    | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 10:30  
Analyzed: 05-Nov-2017 01:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>5.01</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 10:30  
Analyzed: 21-Oct-2017 19:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2        | 0.200           | <b>3.20</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-1-101817-(20)**  
**17J0344-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 10:30  
Analyzed: 22-Oct-2017 02:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 20       | 2.00            | 27.1   | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5F1-1-101817**  
**17J0344-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 11:30  
Analyzed: 23-Oct-2017 19:26

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 110   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 90.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817**  
**17J0344-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 11:30  
Analyzed: 31-Oct-2017 19:02

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817**  
**17J0344-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 11:30  
Analyzed: 31-Oct-2017 19:02

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>121</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>1.30</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817**  
**17J0344-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 11:30  
Analyzed: 02-Nov-2017 13:25

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Reported:  
15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 11:30  
Analyzed: 01-Nov-2017 18:57

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0680</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>127</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>4.45</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>106</b>    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.450</b>  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>122</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>20.3</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>5220</b>   | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 11:30  
Analyzed: 02-Nov-2017 16:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**GW-5F1-1-101817-(20)**  
**17J0344-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 11:30  
Analyzed: 02-Nov-2017 16:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>98.4</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>1.16</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 11:30  
Analyzed: 27-Oct-2017 16:59

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**GW-5F1-1-101817-(20)**  
**17J0344-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 11:30  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 5 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>12600</b> | mg/L  |       |



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15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 11:30  
Analyzed: 20-Oct-2017 07:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------|------------|----------|-----------------|-------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>1.06</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/18/2017 11:30

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>815</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>815</b> | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 11:30  
Analyzed: 05-Nov-2017 02:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 35.1   | mg/L  | D     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 11:30  
Analyzed: 20-Oct-2017 11:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 2        | 0.200           | <b>4.39</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>1.10</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 11:30  
Analyzed: 21-Oct-2017 13:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>5.54</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>5.77</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5F1-1-101817-(20)**  
**17J0344-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 11:30  
Analyzed: 22-Oct-2017 02:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>7540</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5E8-1-101817**  
**17J0344-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 11:45  
Analyzed: 23-Oct-2017 19:46

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.04</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 106   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 87.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 100   | %     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817**  
**17J0344-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 11:45  
Analyzed: 02-Nov-2017 13:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817**  
**17J0344-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 11:45  
Analyzed: 31-Oct-2017 19:06

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>432</b> | ug/L  | D     |

Instrument: ICPMS2 Analyzed: 01-Nov-2017 20:41

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.820</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817**  
**17J0344-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 11:45  
Analyzed: 02-Nov-2017 13:26

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 11:45  
Analyzed: 01-Nov-2017 20:10

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0111</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>12.4</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>2.06</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>7.24</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0533</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>4.18</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>30.2</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>115</b>    | mg/L  |       |





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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/18/2017 11:45  
Analyzed: 03-Nov-2017 22:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 11:45  
Analyzed: 02-Nov-2017 16:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>448</b> | ug/L  | D     |

Instrument: ICPMS2 Analyzed: 03-Nov-2017 22:32

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 2        | 0.680           | 1.00            | <b>0.706</b> | ug/L  | J, D  |
| Nickel, Dissolved | 7440-02-0  | 2        | 0.100           | 1.00            | <b>0.808</b> | ug/L  | J, D  |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 11:45  
Analyzed: 27-Oct-2017 17:01

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 11:45  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 100 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>370</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 11:45  
Analyzed: 20-Oct-2017 07:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.502</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.25</b> | mg-P/L |       |



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Reported:  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/18/2017 11:45

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>190</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>190</b> | mg/L CaCO3 |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 11:45  
Analyzed: 05-Nov-2017 02:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 7.23   | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 11:45  
Analyzed: 21-Oct-2017 19:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>20.9</b> | mg/L  | D     |





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**Reported:**  
15-Nov-2017 17:35

**GW-5E8-1-101817-(20)**  
**17J0344-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 11:45  
Analyzed: 22-Oct-2017 02:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 50       | 5.00            | <b>87.8</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**EB-101717**  
**17J0344-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/17/2017 15:00  
Analyzed: 23-Oct-2017 20:07

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 110   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 88.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**EB-101717**  
**17J0344-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/17/2017 15:00  
Analyzed: 02-Nov-2017 12:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.105</b> | ug/L  |       |



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Reported:  
15-Nov-2017 17:35

**EB-101717**  
**17J0344-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 15:00  
Analyzed: 01-Nov-2017 21:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.0630</b> | ug/L  | J     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>0.496</b>  | ug/L  | J     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | ND            | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**EB-101717**  
**17J0344-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 15:00  
Analyzed: 02-Nov-2017 13:28

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**EB-101717-(20)**  
**17J0344-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/17/2017 15:00  
Analyzed: 01-Nov-2017 20:02

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>0.0082</b> | mg/L  | J     |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0050</b> | mg/L  | J     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | ND            | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | ND            | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | ND            | mg/L  | U     |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | ND            | mg/L  | U     |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | <b>0.569</b>  | mg/L  |       |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**EB-101717-(20)**  
**17J0344-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/17/2017 15:00  
Analyzed: 03-Nov-2017 22:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**EB-101717-(20)**  
**17J0344-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/17/2017 15:00  
Analyzed: 03-Nov-2017 22:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>0.0600</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | ND            | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | ND            | ug/L  | U     |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**EB-101717-(20)**  
**17J0344-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/17/2017 15:00  
Analyzed: 27-Oct-2017 17:02

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765  
Prepared: 26-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**EB-101717-(20)**  
**17J0344-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/17/2017 15:00  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 200 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Solids |            | 1        | 5.0             | ND     | mg/L  | U     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**EB-101717-(20)**  
**17J0344-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/17/2017 15:00  
Analyzed: 20-Oct-2017 07:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | H, U  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
15-Nov-2017 17:35

**EB-101717-(20)**

**17J0344-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/17/2017 15:00  
Analyzed: 25-Oct-2017 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734 Sample Size: 100 mL  
Prepared: 25-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
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**Reported:**  
15-Nov-2017 17:35

**EB-101717-(20)**  
**17J0344-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/17/2017 15:00  
Analyzed: 05-Nov-2017 03:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817**  
**17J0344-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 13:05  
Analyzed: 23-Oct-2017 20:27

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0664 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>6.02</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 112   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 94.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 90.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 104   | %     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817**  
**17J0344-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 13:05  
Analyzed: 02-Nov-2017 14:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817**  
**17J0344-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/18/2017 13:05  
Analyzed: 01-Nov-2017 21:18

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.0490</b> | ug/L  | J     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND            | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | ND            | ug/L  | U     |





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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817**  
**17J0344-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 13:05  
Analyzed: 02-Nov-2017 13:30

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

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Reported:  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 13:05  
Analyzed: 02-Nov-2017 15:56

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881 Sample Size: 25 mL  
Prepared: 31-Oct-2017 Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>0.0066</b> | mg/L  | J     |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0017</b> | mg/L  | J     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | ND            | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | ND            | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | ND            | mg/L  | U     |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>0.0191</b> | mg/L  | J     |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | <b>0.222</b>  | mg/L  | J     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/18/2017 13:05  
Analyzed: 03-Nov-2017 22:42

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/18/2017 13:05  
Analyzed: 03-Nov-2017 22:42

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 2        | 0.0440          | 0.400           | ND     | ug/L  | U     |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | ND     | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | ND     | ug/L  | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 13:05  
Analyzed: 27-Oct-2017 17:04

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 13:05  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 5 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>10500</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:05  
Analyzed: 20-Oct-2017 08:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.326</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/18/2017 13:05

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 893    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 893    | mg/L CaCO3 |       |





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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 13:05  
Analyzed: 05-Nov-2017 04:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:05  
Analyzed: 21-Oct-2017 19:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>8.54</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:05  
Analyzed: 22-Oct-2017 03:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>6470</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-5E1-2-101817-(20)**  
**17J0344-20RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:05  
Analyzed: 27-Oct-2017 21:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>15.8</b> | mg/L  | D     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**EB-101817**  
**17J0344-21 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 14:00  
Analyzed: 25-Oct-2017 12:09

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0731 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.26</b> | ug/L   |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 90.0 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.4 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 94.5 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102 %  |       |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**EB-101817**  
**17J0344-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 14:00  
Analyzed: 31-Oct-2017 19:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**EB-101817**  
**17J0344-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 14:00  
Analyzed: 31-Oct-2017 19:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>282</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND         | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND         | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**EB-101817**  
**17J0344-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 14:00  
Analyzed: 02-Nov-2017 13:31

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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**Reported:**  
15-Nov-2017 17:35

**EB-101817-(20)**  
**17J0344-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 14:00  
Analyzed: 02-Nov-2017 16:45

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0735</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>142</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>29.0</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>336</b>    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>1.39</b>   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>197</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>26.9</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>4070</b>   | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**EB-101817-(20)**  
**17J0344-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 14:00  
Analyzed: 02-Nov-2017 16:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**EB-101817-(20)**  
**17J0344-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 14:00  
Analyzed: 02-Nov-2017 16:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>11.2</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**EB-101817-(20)**  
**17J0344-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 14:00  
Analyzed: 27-Oct-2017 17:06

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765  
Prepared: 26-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**EB-101817-(20)**  
**17J0344-22 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 14:00  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 200 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Solids |            | 1        | 5.0             | ND     | mg/L  | U     |



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Reported:  
15-Nov-2017 17:35

**EB-101817-(20)**  
**17J0344-22 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 14:00  
Analyzed: 20-Oct-2017 08:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | 0.205  | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**EB-101817-(20)**  
**17J0344-22 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/18/2017 14:00  
Analyzed: 25-Oct-2017 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |



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**Reported:**  
15-Nov-2017 17:35

**EB-101817-(20)**  
**17J0344-22RE2 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 14:00  
Analyzed: 13-Nov-2017 21:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>20.3</b> | mg/L  | D     |





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Reported:  
15-Nov-2017 17:35

**GW-4F1-2-101817**  
**17J0344-23 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 13:00  
Analyzed: 26-Oct-2017 10:43

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.11            | 0.40            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.05            | 0.40            | <b>0.06</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.10            | 0.40            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.09            | 0.40            | <b>0.17</b> | ug/L  | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 103   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 94.0  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 96.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102   | %     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817**  
**17J0344-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 13:00  
Analyzed: 31-Oct-2017 19:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817**  
**17J0344-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 13:00  
Analyzed: 31-Oct-2017 19:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>14.1</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>1.36</b> | ug/L  | J, D  |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817**  
**17J0344-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 13:00  
Analyzed: 02-Nov-2017 13:33

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 13:00  
Analyzed: 01-Nov-2017 19:02

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0638</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>140</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>29.6</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>334</b>    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>1.43</b>   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>202</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>26.3</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>3990</b>   | mg/L  | D     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 13:00  
Analyzed: 02-Nov-2017 17:09

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 13:00  
Analyzed: 02-Nov-2017 17:09

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>6.72</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 13:00  
Analyzed: 27-Oct-2017 17:07

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765  
Prepared: 26-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 13:00  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 5 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>11500</b> | mg/L  |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:00  
Analyzed: 20-Oct-2017 08:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.231</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | <b>0.117</b> | mg-N/L |       |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.34</b> | mg-P/L |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/18/2017 13:00  
Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1440   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1440   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:00  
Analyzed: 22-Oct-2017 03:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 4000     | 400             | <b>5930</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 4000     | 400             | <b>825</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24RE2 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 13:00  
Analyzed: 13-Nov-2017 21:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>53.6</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(20)**  
**17J0344-24RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:00  
Analyzed: 22-Oct-2017 06:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>12.9</b> | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
15-Nov-2017 17:35

**GW-4F1-2-101817-(01)**  
**17J0344-25 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/18/2017 13:05  
Analyzed: 26-Oct-2017 11:06

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.11            | 0.40            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.05            | 0.40            | <b>0.07</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.10            | 0.40            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.09            | 0.40            | <b>0.18</b> | ug/L  | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 103   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 95.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 105   | %     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(01)**  
**17J0344-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 13:05  
Analyzed: 31-Oct-2017 19:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |





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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(01)**  
**17J0344-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 13:05  
Analyzed: 31-Oct-2017 19:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0685 Sample Size: 25 mL  
Prepared: 24-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>304</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND         | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND         | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(01)**  
**17J0344-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 13:05  
Analyzed: 02-Nov-2017 13:34

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0682  
Prepared: 24-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/18/2017 13:05  
Analyzed: 01-Nov-2017 19:06

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0651</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>142</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>29.9</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>339</b>    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>1.44</b>   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>197</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>26.6</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>4030</b>   | mg/L  | D     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS1

Sampled: 10/18/2017 13:05  
Analyzed: 02-Nov-2017 17:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS1

Sampled: 10/18/2017 13:05  
Analyzed: 02-Nov-2017 17:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0761 Sample Size: 25 mL  
Prepared: 26-Oct-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>5.78</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/18/2017 13:05  
Analyzed: 27-Oct-2017 17:09

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0765 Sample Size: 20 mL  
Prepared: 26-Oct-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/18/2017 13:05  
Analyzed: 21-Oct-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0625 Sample Size: 5 mL  
Prepared: 21-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>11500</b> | mg/L  |       |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:05  
Analyzed: 20-Oct-2017 09:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567  
Prepared: 19-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.249</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | <b>0.114</b> | mg-N/L |       |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.40</b> | mg-P/L |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/18/2017 13:05  
Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1400</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1400</b> | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/18/2017 13:05  
Analyzed: 05-Nov-2017 06:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 57.4   | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:05  
Analyzed: 22-Oct-2017 03:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 4000     | 400             | <b>5590</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 4000     | 400             | <b>766</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 17:35

**GW-4F1-2-101817-(21)**  
**17J0344-26RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/18/2017 13:05  
Analyzed: 22-Oct-2017 07:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0567 Sample Size: 5 mL  
Prepared: 19-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>12.8</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**TB**  
**17J0344-27 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/16/2017 00:00  
Analyzed: 25-Oct-2017 10:07

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0731 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 85.1  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.5  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 94.7  | %     |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0664 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0664-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 13:01 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.79            |                 | ug/L  | 5.00        |   | 95.9 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.64            |                 | ug/L  | 5.00        |   | 92.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.88            |                 | ug/L  | 5.00        |   | 97.7 | 80-120      |      |           |       |
| <b>LCS (BFJ0664-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 11:35 |      |             |      |           |       |
| Vinyl Chloride                    | 10.3   | 0.06            | 0.20            | ug/L  | 10.0        |   | 103  | 66-133      |      |           |       |
| Chloroform                        | 9.38   | 0.03            | 0.20            | ug/L  | 10.0        |   | 93.8 | 80-122      |      |           |       |
| Trichloroethene                   | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.55            |                 | ug/L  | 5.00        |   | 91.0 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 5.00            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 5.03            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 5.06            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0664-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 11:55 |      |             |      |           |       |
| Vinyl Chloride                    | 11.0   | 0.06            | 0.20            | ug/L  | 10.0        |   | 110  | 66-133      | 6.21 | 30        |       |
| Chloroform                        | 10.1   | 0.03            | 0.20            | ug/L  | 10.0        |   | 101  | 80-122      | 7.72 | 30        |       |
| Trichloroethene                   | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |   | 103  | 80-120      | 2.07 | 30        |       |
| Tetrachloroethene                 | 10.7   | 0.05            | 0.20            | ug/L  | 10.0        |   | 107  | 80-120      | 5.83 | 30        |       |
| Surrogate: Dibromofluoromethane   |        | 5.14            |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.64            |                 | ug/L  | 5.00        |   | 92.9 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 5.04            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 5.05            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.94            |                 | ug/L  | 5.00        |   | 98.8 | 80-120      |      |           |       |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0731 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: LH

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0731-BLK2)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 09:35 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.42            |                 | ug/L  | 5.00        |   | 88.4 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.78            |                 | ug/L  | 5.00        |   | 95.7 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.77            |                 | ug/L  | 5.00        |   | 95.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.12            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFJ0731-BS2)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 08:14 |      |             |      |           |       |
| Vinyl Chloride                           | 9.76   |                 |                 | ug/L  | 10.0        |   | 97.6 | 66-133      |      |           |       |
| Chloroform                               | 9.39   |                 |                 | ug/L  | 10.0        |   | 93.9 | 80-122      |      |           |       |
| Trichloroethene                          | 9.70   |                 |                 | ug/L  | 10.0        |   | 97.0 | 80-120      |      |           |       |
| Tetrachloroethene                        | 9.55   |                 |                 | ug/L  | 10.0        |   | 95.5 | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.76            |                 | ug/L  | 5.00        |   | 95.2 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.20            |                 | ug/L  | 5.00        |   | 84.0 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.94            |                 | ug/L  | 5.00        |   | 98.8 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.88            |                 | ug/L  | 5.00        |   | 97.6 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.04            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0731-BSD2)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 08:54 |      |             |      |           |       |
| Vinyl Chloride                           | 9.79   |                 |                 | ug/L  | 10.0        |   | 97.9 | 66-133      | 0.30 | 30        |       |
| Chloroform                               | 9.34   |                 |                 | ug/L  | 10.0        |   | 93.4 | 80-122      | 0.49 | 30        |       |
| Trichloroethene                          | 9.98   |                 |                 | ug/L  | 10.0        |   | 99.8 | 80-120      | 2.88 | 30        |       |
| Tetrachloroethene                        | 9.92   |                 |                 | ug/L  | 10.0        |   | 99.2 | 80-120      | 3.77 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.69            |                 | ug/L  | 5.00        |   | 93.9 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.16            |                 | ug/L  | 5.00        |   | 83.2 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.98            |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

### Volatile Organic Compounds - Quality Control

#### Batch BFJ0771 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PAB

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0771-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 09:39 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | 0.05   | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.66            |                 | ug/L  | 5.00        |   | 93.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.78            |                 | ug/L  | 5.00        |   | 95.6 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.61            |                 | ug/L  | 5.00        |   | 92.3 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.20            |                 | ug/L  | 5.00        |   | 104  | 80-120      |      |           |       |
| <b>LCS (BFJ0771-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 07:58 |      |             |      |           |       |
| Vinyl Chloride                           | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      |      |           |       |
| Chloroform                               | 9.93   | 0.03            | 0.20            | ug/L  | 10.0        |   | 99.3 | 80-122      |      |           |       |
| Trichloroethene                          | 10.0   | 0.05            | 0.20            | ug/L  | 10.0        |   | 100  | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.82            |                 | ug/L  | 5.00        |   | 96.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.43            |                 | ug/L  | 5.00        |   | 88.7 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.97            |                 | ug/L  | 5.00        |   | 99.4 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.12            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.05            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0771-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 08:38 |      |             |      |           |       |
| Vinyl Chloride                           | 10.3   | 0.06            | 0.20            | ug/L  | 10.0        |   | 103  | 66-133      | 1.99 | 30        |       |
| Chloroform                               | 9.94   | 0.03            | 0.20            | ug/L  | 10.0        |   | 99.4 | 80-122      | 0.11 | 30        |       |
| Trichloroethene                          | 9.85   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.5 | 80-120      | 1.64 | 30        |       |
| Tetrachloroethene                        | 9.89   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.9 | 80-120      | 3.34 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.92            |                 | ug/L  | 5.00        |   | 98.3 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.49            |                 | ug/L  | 5.00        |   | 89.7 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.10            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |





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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0682 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0682-BLK1)</b>       |         |                 |       |             | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:04 |      |             |     |           |       |
| Mercury                           | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0682-BS1)</b>          |         |                 |       |             | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:06 |      |             |     |           |       |
| Mercury                           | 0.00236 | 0.000100        | mg/L  | 0.00200     |   | 118  | 80-120      |     |           |       |
| <b>Duplicate (BFJ0682-DUP1)</b>   |         |                 |       |             | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:09 |      |             |     |           |       |
| Mercury                           | ND      | 0.000100        | mg/L  |             | ND  |      |             |     |           | L, U  |
| <b>Matrix Spike (BFJ0682-MS1)</b> |         |                 |       |             | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:11 |      |             |     |           |       |
| Mercury                           | 0.00113 | 0.000100        | mg/L  | 0.00100     | ND  | 110  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0685 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 Analyst: TCH

| QC Sample/Analyte           | Isotope | Result | Detection Limit                                   | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|---|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0685-BLK1)</b> |         |        | Prepared: 24-Oct-2017 Analyzed: 31-Oct-2017 17:29 |                 |       |             |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680  | 0.100           | ug/L  |             |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220  | 0.200           | ug/L  |             |               |      |             |     |           | U     |
| Copper                      | 63      | ND     | 0.340   | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350   | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Nickel                      | 60      | ND     | 0.0500  | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Nickel                      | 62      | ND     | 0.220   | 0.500           | ug/L  |             |               |      |             |     |           | U     |

|                          |     |      |   |       |      |      |  |     |        |  |  |  |
|--------------------------|-----|------|---|-------|------|------|--|-----|--------|--|--|--|
| <b>LCS (BFJ0685-BS1)</b> |     |      | Prepared: 24-Oct-2017 Analyzed: 31-Oct-2017 17:33 |       |      |      |  |     |        |  |  |  |
| Lead                     | 208 | 26.4 | 0.0680  | 0.100 | ug/L | 25.0 |  | 106 | 80-120 |  |  |  |
| Arsenic                  | 75a | 25.5 | 0.0220  | 0.200 | ug/L | 25.0 |  | 102 | 80-120 |  |  |  |
| Copper                   | 63  | 28.1 | 0.340   | 0.500 | ug/L | 25.0 |  | 112 | 80-120 |  |  |  |
| Copper                   | 65  | 27.7 | 0.350   | 0.500 | ug/L | 25.0 |  | 111 | 80-120 |  |  |  |
| Nickel                   | 60  | 27.3 | 0.0500  | 0.500 | ug/L | 25.0 |  | 109 | 80-120 |  |  |  |
| Nickel                   | 62  | 28.1 | 0.220   | 0.500 | ug/L | 25.0 |  | 113 | 80-120 |  |  |  |

|                                 |     |      |                    |      |   |  |      |  |  |      |    |   |
|---------------------------------|-----|------|--------------------|------|---|--|------|--|--|------|----|---|
| <b>Duplicate (BFJ0685-DUP1)</b> |     |      | Source: 17J0344-01 |      | Prepared: 24-Oct-2017 Analyzed: 31-Oct-2017 18:36 |  |      |  |  |      |    |   |
| Arsenic                         | 75a | 1980 | 0.440              | 4.00 | ug/L  |  | 1960 |  |  | 0.98 | 20 | D |

|                                 |     |      |                    |       |   |  |      |  |  |      |    |   |
|---------------------------------|-----|------|--------------------|-------|---|--|------|--|--|------|----|---|
| <b>Duplicate (BFJ0685-DUP3)</b> |     |      | Source: 17J0344-01 |       | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:52 |  |      |  |  |      |    |   |
| Lead                            | 208 | 1.64 | 0.340              | 0.500 | ug/L  |  | 1.56 |  |  | 5.00 | 20 | D |

|                                   |     |      |                    |      |   |      |      |      |        |  |  |       |
|-----------------------------------|-----|------|--------------------|------|---|------|------|------|--------|--|--|-------|
| <b>Matrix Spike (BFJ0685-MS1)</b> |     |      | Source: 17J0344-01 |      | Prepared: 24-Oct-2017 Analyzed: 31-Oct-2017 18:44 |      |      |      |        |  |  |       |
| Arsenic                           | 75a | 1970 | 0.440              | 4.00 | ug/L  | 25.0 | 1960 | 55.1 | 75-125 |  |  | HC, D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |     |      |                    |       |   |      |      |      |        |  |  |   |
|-----------------------------------|-----|------|--------------------|-------|---|------|------|------|--------|--|--|---|
| <b>Matrix Spike (BFJ0685-MS3)</b> |     |      | Source: 17J0344-01 |       | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 14:00 |      |      |      |        |  |  |   |
| Lead                              | 208 | 24.8 | 0.340              | 0.500 | ug/L  | 25.0 | 1.56 | 93.0 | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte               | Isotope | Result | Detection Limit                                   | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---------------------------------|---------|--------|---|-----------------|-------|-------------|---------------|------|-------------|-------|-----------|-------|
| <b>Duplicate (BFJ0685-DUP2)</b> |         |        | Prepared: 24-Oct-2017 Analyzed: 01-Nov-2017 21:53 |                 |       |             |               |      |             |       |           |       |
| Copper                          | 63      | 3.01   | 1.70  | 2.50            | ug/L  |             | 2.14          |      |             | 33.60 | 20        | L, D  |
| Nickel                          | 60      | 5.74   | 0.250   | 2.50            | ug/L  |             | 5.05          |      |             | 12.90 | 20        | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0685 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte                 | Isotope | Result                    | Detection Limit | Reporting Limit | Units   | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-----------------|-----------------|---|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0685-MS2)</b> |         | <b>Source: 17J0344-01</b> |                 |                 | Prepared: 24-Oct-2017 Analyzed: 01-Nov-2017 22:04 |             |               |      |             |     |           |       |
| Copper                            | 63      | 28.9                      | 1.70            | 2.50            | ug/L  | 25.0        | 2.14          | 107  | 75-125      |     |           | D     |
| Nickel                            | 60      | 31.2                      | 0.250           | 2.50            | ug/L  | 25.0        | 5.05          | 105  | 75-125      |     |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0761 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: TCH

| QC Sample/Analyte                 | Isotope | Result | Detection Limit                                   | Reporting Limit | Units   | Spike Level | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|---------|--------|---|-----------------|---|-------------|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0761-BLK1)</b>       |         |        | Prepared: 26-Oct-2017 Analyzed: 03-Nov-2017 20:13 |                 |   |             |               |      |             |       |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680  | 0.100           | ug/L  |             |               |      |             |       |           | U     |
| Arsenic, Dissolved                | 75a     | 0.109  | 0.0220  | 0.200           | ug/L  |             |               |      |             |       |           | J     |
| Copper, Dissolved                 | 63      | ND     | 0.340   | 0.500           | ug/L  |             |               |      |             |       |           | U     |
| Copper, Dissolved                 | 65      | ND     | 0.350   | 0.500           | ug/L  |             |               |      |             |       |           | U     |
| Nickel, Dissolved                 | 60      | ND     | 0.0500  | 0.500           | ug/L  |             |               |      |             |       |           | U     |
| Nickel, Dissolved                 | 62      | ND     | 0.220   | 0.500           | ug/L  |             |               |      |             |       |           | U     |
| <b>LCS (BFJ0761-BS1)</b>          |         |        | Prepared: 26-Oct-2017 Analyzed: 03-Nov-2017 20:58 |                 |   |             |               |      |             |       |           |       |
| Lead, Dissolved                   | 208     | 27.2   | 0.0680  | 0.100           | ug/L  | 25.0        |               | 109  | 80-120      |       |           |       |
| Arsenic, Dissolved                | 75a     | 24.9   | 0.0220  | 0.200           | ug/L  | 25.0        |               | 99.8 | 80-120      |       |           |       |
| Copper, Dissolved                 | 63      | 26.4   | 0.340   | 0.500           | ug/L  | 25.0        |               | 106  | 80-120      |       |           |       |
| Copper, Dissolved                 | 65      | 26.4   | 0.350   | 0.500           | ug/L  | 25.0        |               | 106  | 80-120      |       |           |       |
| Nickel, Dissolved                 | 60      | 25.5   | 0.0500  | 0.500           | ug/L  | 25.0        |               | 102  | 80-120      |       |           |       |
| Nickel, Dissolved                 | 62      | 25.3   | 0.220   | 0.500           | ug/L  | 25.0        |               | 101  | 80-120      |       |           |       |
| <b>Duplicate (BFJ0761-DUP1)</b>   |         |        | <b>Source: 17J0344-02</b>                         |                 | Prepared: 26-Oct-2017 Analyzed: 03-Nov-2017 20:43 |             |               |      |             |       |           |       |
| Lead, Dissolved                   | 208     | 1.11   | 0.680   | 1.00            | ug/L  |             | 1.07          |      |             | 3.67  | 20        | D     |
| Arsenic, Dissolved                | 75a     | 1730   | 0.220   | 2.00            | ug/L  |             | 1640          |      |             | 5.54  | 20        | D     |
| Copper, Dissolved                 | 63      | ND     | 3.40  | 5.00            | ug/L  |             | ND            |      |             |       |           | U     |
| Nickel, Dissolved                 | 60      | 4.34   | 0.500   | 5.00            | ug/L  |             | 3.67          |      |             | 16.70 | 20        | J, D  |
| <b>Matrix Spike (BFJ0761-MS1)</b> |         |        | <b>Source: 17J0344-02</b>                         |                 | Prepared: 26-Oct-2017 Analyzed: 03-Nov-2017 20:52 |             |               |      |             |       |           |       |
| Lead, Dissolved                   | 208     | 27.8   | 0.680   | 1.00            | ug/L  | 25.0        | 1.07          | 107  | 75-125      |       |           | D     |
| Arsenic, Dissolved                | 75a     | 1700   | 0.220   | 2.00            | ug/L  | 25.0        | 1640          | 239  | 75-125      |       |           | HC, D |
| Copper, Dissolved                 | 63      | 25.7   | 3.40  | 5.00            | ug/L  | 25.0        | ND            | 103  | 75-125      |       |           | D     |
| Nickel, Dissolved                 | 60      | 29.2   | 0.500   | 5.00            | ug/L  | 25.0        | 3.67          | 102  | 75-125      |       |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0765 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0765-BLK1)</b>       |         |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 16:24                    |      |             |     |           |       |
| Mercury, Dissolved                | ND      | 0.000100        | mg/L  |             |  |      |             |     |           | U     |
| <b>LCS (BFJ0765-BS1)</b>          |         |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 16:25                    |      |             |     |           |       |
| Mercury, Dissolved                | 0.00211 | 0.000100        | mg/L  | 0.00200     |  | 106  | 80-120      |     |           |       |
| <b>Duplicate (BFJ0765-DUP1)</b>   |         |                 |       |             | Source: 17J0344-02 Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 16:44 |      |             |     |           |       |
| Mercury, Dissolved                | ND      | 0.000100        | mg/L  |             | ND   |      |             |     |           | L, U  |
| <b>Matrix Spike (BFJ0765-MS1)</b> |         |                 |       |             | Source: 17J0344-02 Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 16:45 |      |             |     |           |       |
| Mercury, Dissolved                | 0.00108 | 0.000100        | mg/L  | 0.00100     | ND   | 105  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0881 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|-----------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0881-BLK1)</b> |        |                 |                 |       |             |   |           |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 31-Oct-2017 Analyzed: 01-Nov-2017 19:39 |           |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |           |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |           |             |     |           | U     |
| Iron, Dissolved             | 0.0033 | 0.0013          | 0.0500          | mg/L  |             |   |           |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |           |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |           |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |           |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |           |             |     |           | U     |
| Sodium, Dissolved           | 0.372  | 0.0114          | 0.500           | mg/L  |             |   |           |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |           |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFJ0881-BS1)</b> |       |        |        |      |       |   |      |        |  |  |   |
|                          |       |        |        |      |       | Prepared: 31-Oct-2017 Analyzed: 01-Nov-2017 19:56 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.01  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 100  | 80-120 |  |  |   |
| Calcium, Dissolved       | 9.45  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 94.5 | 80-120 |  |  |   |
| Iron, Dissolved          | 2.03  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 101  | 80-120 |  |  |   |
| Magnesium, Dissolved     | 10.2  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 102  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.497 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 99.4 | 80-120 |  |  |   |
| Potassium, Dissolved     | 8.98  | 0.0520 | 0.500  | mg/L | 10.0  |   | 89.8 | 80-120 |  |  |   |
| Silicon, Dissolved       | 9.90  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 99.0 | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.89  | 0.0114 | 0.500  | mg/L | 10.0  |   | 98.9 | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.8  | 1.90   | 50.0   | mg/L | 10.0  |   | 108  | 80-120 |  |  | J |

|                                 |        |        |                    |      |  |   |  |  |      |    |   |
|---------------------------------|--------|--------|--------------------|------|--|---|--|--|------|----|---|
| <b>Duplicate (BFJ0881-DUP1)</b> |        |        |                    |      |  |   |  |  |      |    |   |
|                                 |        |        | Source: 17J0344-02 |      |  | Prepared: 31-Oct-2017 Analyzed: 02-Nov-2017 16:29 |  |  |      |    |   |
| Aluminum, Dissolved             | 0.0784 | 0.0085 | 0.0500             | mg/L |  | 0.0843  |  |  | 7.33 | 20 |   |
| Calcium, Dissolved              | 5.55   | 0.0051 | 0.0500             | mg/L |  | 5.54  |  |  | 0.31 | 20 |   |
| Iron, Dissolved                 | 2.87   | 0.0013 | 0.0500             | mg/L |  | 2.84  |  |  | 1.26 | 20 |   |
| Magnesium, Dissolved            | 4.97   | 0.0160 | 0.0500             | mg/L |  | 4.95  |  |  | 0.39 | 20 |   |
| Manganese, Dissolved            | 0.0153 | 0.0003 | 0.0010             | mg/L |  | 0.0152  |  |  | 0.42 | 20 |   |
| Potassium, Dissolved            | 34.2   | 0.0520 | 0.500              | mg/L |  | 34.2  |  |  | 0.20 | 20 |   |
| Silicon, Dissolved              | 56.5   | 0.0052 | 0.0600             | mg/L |  | 56.0  |  |  | 0.80 | 20 |   |
| Sodium, Dissolved               | 1500   | 0.0114 | 0.500              | mg/L |  | 1510  |  |  | 0.54 | 20 | E |
| Sodium, Dissolved               | 1450   | 1.90   | 50.0               | mg/L |  | 1450  |  |  | 0.46 | 20 |   |

|                                   |      |        |                    |      |      |   |      |        |  |  |  |
|-----------------------------------|------|--------|--------------------|------|------|---|------|--------|--|--|--|
| <b>Matrix Spike (BFJ0881-MS1)</b> |      |        |                    |      |      |   |      |        |  |  |  |
|                                   |      |        | Source: 17J0344-02 |      |      | Prepared: 31-Oct-2017 Analyzed: 02-Nov-2017 16:38 |      |        |  |  |  |
| Aluminum, Dissolved               | 2.13 | 0.0085 | 0.0500             | mg/L | 2.00 | 0.0843  | 102  | 75-125 |  |  |  |
| Calcium, Dissolved                | 15.3 | 0.0051 | 0.0500             | mg/L | 10.0 | 5.54  | 98.1 | 75-125 |  |  |  |
| Iron, Dissolved                   | 4.84 | 0.0013 | 0.0500             | mg/L | 2.00 | 2.84  | 100  | 75-125 |  |  |  |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0881 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte                 | Result | Detection Limit           | Reporting Limit | Units   | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|-----------------|---|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0881-MS1)</b> |        | <b>Source: 17J0344-02</b> |                 | Prepared: 31-Oct-2017 Analyzed: 02-Nov-2017 16:38 |             |               |      |             |     |           |       |
| Magnesium, Dissolved              | 15.3   | 0.0160                    | 0.0500          | mg/L  | 10.0        | 4.95          | 103  | 75-125      |     |           |       |
| Manganese, Dissolved              | 0.480  | 0.0003                    | 0.0010          | mg/L  | 0.500       | 0.0152        | 93.0 | 75-125      |     |           |       |
| Potassium, Dissolved              | 47.4   | 0.0520                    | 0.500           | mg/L  | 10.0        | 34.2          | 132  | 75-125      |     |           | *     |
| Silicon, Dissolved                | 64.2   | 0.0052                    | 0.0600          | mg/L  | 10.0        | 56.0          | 82.3 | 75-125      |     |           |       |
| Sodium, Dissolved                 | 1510   | 0.0114                    | 0.500           | mg/L  | 10.0        | 1510          | NR   | 75-125      |     |           | E     |
| Sodium, Dissolved                 | 1430   | 1.90                      | 50.0            | mg/L  | 10.0        | 1450          | NR   | 75-125      |     |           | HC    |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

Wet Chemistry - Quality Control

Batch BFJ0567 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0567-BLK1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 03:29                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| <b>LCS (BFJ0567-BS1)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 03:50                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.48   | 0.100           | mg/L   | 1.50        |               | 98.7 | 90-110      |      |           |       |
| Chloride  | 1.51   | 0.100           | mg/L   | 1.50        |               | 100  | 90-110      |      |           |       |
| Fluoride  | 1.52   | 0.100           | mg/L   | 1.50        |               | 101  | 90-110      |      |           |       |
| Nitrate-N   | 1.54   | 0.100           | mg-N/L | 1.50        |               | 102  | 90-110      |      |           |       |
| Nitrite-N   | 1.54   | 0.100           | mg-N/L | 1.50        |               | 102  | 90-110      |      |           |       |
| Orthophosphorus   | 1.49   | 0.10            | mg-P/L | 1.50        |               | 99.5 | 90-110      |      |           |       |
| Sulfate   | 1.54   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0567-DUP1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0344-03 Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 04:31    |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 0.200  | 0.100           | mg/L   |             | 0.193         |      |             | 3.56 | 20        |       |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             | ND            |      |             |      |           | U     |
| <b>Duplicate (BFJ0567-DUP2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0344-03RE1 Prepared: 19-Oct-2017 Analyzed: 21-Oct-2017 17:55 |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 9.20   | 2.00            | mg/L   |             | 9.16          |      |             | 0.50 | 20        | D     |
| Sulfate   | 49.5   | 2.00            | mg/L   |             | 49.6          |      |             | 0.16 | 20        | D     |
| <b>Duplicate (BFJ0567-DUP3)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0344-03RE2 Prepared: 19-Oct-2017 Analyzed: 21-Oct-2017 23:55 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 7460   | 500             | mg/L   |             | 7580          |      |             | 1.59 | 20        | D     |
| <b>Duplicate (BFJ0567-DUP4)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0344-03RE2 Prepared: 19-Oct-2017 Analyzed: 22-Oct-2017 00:16 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 7650   | 500             | mg/L   |             | 7580          |      |             | 1.00 | 20        | D     |
| <b>Matrix Spike (BFJ0567-MS1)</b>                                       |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0344-03 Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 04:51    |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 0.928  | 0.100           | mg/L   | 2.00        | 0.193         | 36.8 | 75-125      |      |           | *     |
| Nitrate-N   | 2.06   | 0.100           | mg-N/L | 2.00        | ND            | 103  | 75-125      |      |           |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

Wet Chemistry - Quality Control

Batch BFJ0567 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**Matrix Spike (BFJ0567-MS1)** Source: 17J0344-03 Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 04:51

|                 |      |       |        |      |    |      |        |  |  |   |
|-----------------|------|-------|--------|------|----|------|--------|--|--|---|
| Nitrite-N       | 1.44 | 0.100 | mg-N/L | 2.00 | ND | 72.2 | 75-125 |  |  | * |
| Orthophosphorus | 1.17 | 0.10  | mg-P/L | 2.00 | ND | 58.7 | 75-125 |  |  | * |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0567-MS2)** Source: 17J0344-03 Prepared: 19-Oct-2017 Analyzed: 20-Oct-2017 11:54

|                 |      |       |        |      |    |      |        |  |  |   |
|-----------------|------|-------|--------|------|----|------|--------|--|--|---|
| Nitrite-N       | 1.55 | 0.100 | mg-N/L | 2.00 | ND | 77.4 | 75-125 |  |  |   |
| Orthophosphorus | 1.19 | 0.10  | mg-P/L | 2.00 | ND | 59.6 | 75-125 |  |  | * |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0567-MS3)** Source: 17J0344-03RE1 Prepared: 19-Oct-2017 Analyzed: 21-Oct-2017 18:14

|         |      |      |      |      |      |      |        |  |  |   |
|---------|------|------|------|------|------|------|--------|--|--|---|
| Bromide | 27.2 | 5.00 | mg/L | 20.0 | 9.16 | 90.4 | 75-125 |  |  | D |
|---------|------|------|------|------|------|------|--------|--|--|---|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0567-MS5)** Source: 17J0344-03RE1 Prepared: 19-Oct-2017 Analyzed: 25-Oct-2017 22:01

|         |     |      |      |      |      |     |        |  |  |   |
|---------|-----|------|------|------|------|-----|--------|--|--|---|
| Sulfate | 103 | 5.00 | mg/L | 50.0 | 49.6 | 107 | 75-125 |  |  | D |
|---------|-----|------|------|------|------|-----|--------|--|--|---|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

### Wet Chemistry - Quality Control

#### Batch BFJ0590 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD | RPD Limit | Notes |
|---------------------------------|--------|---|------------|-------------|---------------|------|--------------|-----|-----------|-------|
| <b>Blank (BFJ0590-BLK1)</b>     |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:50 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| <b>Blank (BFJ0590-BLK2)</b>     |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 15:05 |            |             |               |      |              |     |           |       |
| Alkalinity, Bicarbonate         | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| Alkalinity, Carbonate           | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| Alkalinity, Hydroxide           | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| <b>Reference (BFJ0590-SRM1)</b> |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 10:50 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | 105    | 1.00  | mg/L CaCO3 | 108         |               | 96.8 | 90.37-108.33 |     |           |       |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

Wet Chemistry - Quality Control

Batch BFJ0592 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units  | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|---|--------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0592-BLK1)</b>       |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 13:12 |        |   |               |      |             |      |           |       |
| Bromide                           | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Chloride                          | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Fluoride                          | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Nitrate-N                         | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| Nitrite-N                         | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| Orthophosphorus                   | ND     | 0.10  | mg-P/L |   |               |      |             |      |           | U     |
| Sulfate                           | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| <b>LCS (BFJ0592-BS1)</b>          |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 13:32 |        |   |               |      |             |      |           |       |
| Bromide                           | 1.48   | 0.100   | mg/L   | 1.50  |               | 98.5 | 90-110      |      |           |       |
| Chloride                          | 1.51   | 0.100   | mg/L   | 1.50  |               | 100  | 90-110      |      |           |       |
| Fluoride                          | 1.53   | 0.100   | mg/L   | 1.50  |               | 102  | 90-110      |      |           |       |
| Nitrate-N                         | 1.54   | 0.100   | mg-N/L | 1.50  |               | 102  | 90-110      |      |           |       |
| Nitrite-N                         | 1.54   | 0.100   | mg-N/L | 1.50  |               | 102  | 90-110      |      |           |       |
| Orthophosphorus                   | 1.50   | 0.10  | mg-P/L | 1.50  |               | 100  | 90-110      |      |           |       |
| Sulfate                           | 1.53   | 0.100   | mg/L   | 1.50  |               | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0592-DUP1)</b>   |        | <b>Source: 17J0344-02</b>                         |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 14:12 |               |      |             |      |           |       |
| Bromide                           | 1.12   | 0.100   | mg/L   |   | 1.11          |      |             | 0.63 | 20        |       |
| Fluoride                          | 1.04   | 0.100   | mg/L   |   | 1.04          |      |             | 0.19 | 20        |       |
| Nitrate-N                         | ND     | 0.100   | mg-N/L |   | ND            |      |             |      |           | H, U  |
| Nitrite-N                         | ND     | 0.100   | mg-N/L |   | ND            |      |             |      |           | H, U  |
| <b>Duplicate (BFJ0592-DUP2)</b>   |        | <b>Source: 17J0344-02RE1</b>                      |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 17:34 |               |      |             |      |           |       |
| Orthophosphorus                   | 8.73   | 0.50  | mg-P/L |   | 8.88          |      |             | 1.69 | 20        | H, D  |
| <b>Duplicate (BFJ0592-DUP3)</b>   |        | <b>Source: 17J0344-02RE2</b>                      |        | Prepared: 20-Oct-2017 Analyzed: 21-Oct-2017 21:52 |               |      |             |      |           |       |
| Sulfate                           | 161    | 10.0  | mg/L   |   | 162           |      |             | 0.15 | 20        | D     |
| <b>Duplicate (BFJ0592-DUP4)</b>   |        | <b>Source: 17J0344-02</b>                         |        | Prepared: 20-Oct-2017 Analyzed: 22-Oct-2017 05:14 |               |      |             |      |           |       |
| Chloride                          | 1400   | 100   | mg/L   |   | 1410          |      |             | 0.63 | 20        | D     |
| <b>Duplicate (BFJ0592-DUP5)</b>   |        | <b>Source: 17J0344-02</b>                         |        | Prepared: 20-Oct-2017 Analyzed: 22-Oct-2017 05:34 |               |      |             |      |           |       |
| Chloride                          | 1400   | 100   | mg/L   |   | 1410          |      |             | 0.57 | 20        | D     |
| <b>Matrix Spike (BFJ0592-MS1)</b> |        | <b>Source: 17J0344-02</b>                         |        | Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 14:32 |               |      |             |      |           |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

### Wet Chemistry - Quality Control

#### Batch BFJ0592 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**Matrix Spike (BFJ0592-MS1)** Source: 17J0344-02 Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 14:32

|           |      |       |        |      |    |      |        |  |  |   |
|-----------|------|-------|--------|------|----|------|--------|--|--|---|
| Nitrate-N | 2.01 | 0.100 | mg-N/L | 2.00 | ND | 100  | 75-125 |  |  | H |
| Nitrite-N | 1.90 | 0.100 | mg-N/L | 2.00 | ND | 95.2 | 75-125 |  |  | H |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0592-MS2)** Source: 17J0344-02RE1 Prepared: 20-Oct-2017 Analyzed: 20-Oct-2017 17:53

|                 |      |      |        |      |      |      |        |  |  |      |
|-----------------|------|------|--------|------|------|------|--------|--|--|------|
| Orthophosphorus | 18.2 | 1.00 | mg-P/L | 10.0 | 8.88 | 93.1 | 75-125 |  |  | H, D |
|-----------------|------|------|--------|------|------|------|--------|--|--|------|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0592-MS3)** Source: 17J0344-02RE2 Prepared: 20-Oct-2017 Analyzed: 21-Oct-2017 22:12

|         |     |      |      |     |     |     |        |  |  |   |
|---------|-----|------|------|-----|-----|-----|--------|--|--|---|
| Sulfate | 363 | 20.0 | mg/L | 200 | 162 | 101 | 75-125 |  |  | D |
|---------|-----|------|------|-----|-----|-----|--------|--|--|---|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0592-MS4)** Source: 17J0344-02 Prepared: 20-Oct-2017 Analyzed: 22-Oct-2017 09:15

|          |      |       |      |      |      |     |        |  |  |   |
|----------|------|-------|------|------|------|-----|--------|--|--|---|
| Bromide  | 3.36 | 0.200 | mg/L | 2.00 | 1.11 | 112 | 75-125 |  |  | D |
| Fluoride | 3.16 | 0.200 | mg/L | 2.00 | 1.04 | 106 | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**Wet Chemistry - Quality Control**

**Batch BFJ0625 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0625-BLK1)</b> |        |                 |       |             | Prepared: 21-Oct-2017 Analyzed: 21-Oct-2017 13:55 |      |             |     |           |       |
| Dissolved Solids            | ND     | 0.5             | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0625-BS1)</b>    |        |                 |       |             | Prepared: 21-Oct-2017 Analyzed: 21-Oct-2017 13:55 |      |             |     |           |       |
| Dissolved Solids            | 490    | 1.0             | mg/L  | 500         |   | 98.0 | 90-110      |     |           |       |



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**Reported:**  
15-Nov-2017 17:35

**Wet Chemistry - Quality Control**

**Batch BFJ0655 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: gm

| QC Sample/Analyte                   | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-------------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0655-BLK1)</b>         |        |                           |       |             |   |      |             |      |           |       |
|                                     |        |                           |       |             | Prepared: 23-Oct-2017 Analyzed: 04-Nov-2017 22:26 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50                      | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0655-BS1)</b>            |        |                           |       |             |   |      |             |      |           |       |
|                                     |        |                           |       |             | Prepared: 23-Oct-2017 Analyzed: 04-Nov-2017 22:45 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 20.6   | 0.50                      | mg/L  | 20.0        |   | 103  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0655-DUP1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                     |        | <b>Source: 17J0344-02</b> |       |             | Prepared: 23-Oct-2017 Analyzed: 05-Nov-2017 00:10 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 18.7   | 1.00                      | mg/L  |             | 18.2  |      |             | 2.55 | 20        | D     |
| <b>Matrix Spike (BFJ0655-MS1)</b>   |        |                           |       |             |   |      |             |      |           |       |
|                                     |        | <b>Source: 17J0344-02</b> |       |             | Prepared: 23-Oct-2017 Analyzed: 05-Nov-2017 00:32 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 38.5   | 1.00                      | mg/L  | 20.0        | 18.2  | 101  | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**Wet Chemistry - Quality Control**

**Batch BFJ0734 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte  | Result | Reporting Limit | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|--|--------|-----------------|------------|-------------|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0734-BLK1)</b>  |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:20                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Blank (BFJ0734-BLK2)</b>  |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 17:15                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Duplicate (BFJ0734-DUP1)</b>                                      |        |                 |            |             |               |      |              |      |           |       |
| Source: 17J0344-03 Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:20 |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | 1310   | 1.00            | mg/L CaCO3 |             | 1310          |      |              | 0.23 | 20        |       |
| <b>Reference (BFJ0734-SRM1)</b>                                      |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:20                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | 101    | 1.00            | mg/L CaCO3 | 108         |               | 93.9 | 90.37-108.33 |      |           |       |



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Reported:  
15-Nov-2017 17:35

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 17:35

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 17:35

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- M Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to +/- RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



15 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0394

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-685-6201 (fax)



Date: October 20, 2017  
 Page: 1 of 2  
 No. of Coolers: 1  
 Cooler Temps:

Turn-around Requested: Normal  
 ARI Assigned Number: 17J0394  
 ARI Client Company: Pioneer Technologies  
 Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)

Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: D Cooper 206-660-3496  
T Dreher / L Kermer / D Pickering

| Sample ID           | Date       | Time  | Matrix | No. Containers | Analysis Requested                          |   |                       |   |   |   |  |                                      |                            |   | Notes/Comments |   |
|---------------------|------------|-------|--------|----------------|---|---|-----------------------|---|---|---|--|--------------------------------------|----------------------------|---|----------------|---|
|                     |            |       |        |                | Total As. Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni<br>EPA 6020A/7470A | Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 180.1 | Dissolved DOC<br>SM 5310 B |   |                |   |
| GW-6E5-1-102017     | 10/20/2017 | 9:15  | WATER  | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                | All dissolved samples field filtered 0.45uM |
| GW-6E5-1-102017-020 |            | 9:15  |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |
| GW-6F1-2-102017     |            | 10:40 |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |
| GW-6F1-2-102017-020 |            | 10:40 |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |
| GW-6F2-1-102017     |            | 11:40 |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |
| GW-6F2-1-102017-020 |            | 11:40 |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |
| GW-5G1-1-102017     |            | 12:10 |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |
| GW-5G1-1-102017-020 |            | 12:10 |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |
| GW-6G1-1-102017     |            | 12:40 |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |
| GW-6G1-1-102017-020 |            | 12:40 |        | 4              | X   | X   | X                     | X   | X   | X   | X  | X                                    | X                          | X |                |   |

Comments/Special Instructions: Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma CO#79227

Relinquished by (Signature): [Signature] Received by (Signature): [Signature]  
 Printed Name: Luke How Printed Name: Brandon Fisk  
 Company: POF Company: ARI  
 Date & Time: 10/20/17 1655 Date & Time: 10/20/17 1655

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: **20 OCTOBER 2017**  
 Page: **2** of **2**  
 No. of Coolers: **1**  
 Temps:

### Analysis Requested

| Analysis Requested   | Received by (Signature) | Printed Name | Company | Date & Time   |
|--|-------------------------|--------------|---------|---------------|
| Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A   | <i>[Signature]</i>      | Brandon Fick | ARI     | 10/20/17 1655 |
| Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A   | <i>[Signature]</i>      | Brandon Fick | ARI     | 10/20/17 1655 |
| PCE, TCE Vinyl chloride, Chloroform EPA 8260C  | <i>[Signature]</i>      | Brandon Fick | ARI     | 10/20/17 1655 |
| Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C  | <i>[Signature]</i>      | Brandon Fick | ARI     | 10/20/17 1655 |
| Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0 | <i>[Signature]</i>      | Brandon Fick | ARI     | 10/20/17 1655 |
| Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320                                   | <i>[Signature]</i>      | Brandon Fick | ARI     | 10/20/17 1655 |
| Dissolved TDS SM 2540 C/EPA 160.1  | <i>[Signature]</i>      | Brandon Fick | ARI     | 10/20/17 1655 |
| Dissolved DOC SM 5310 B  | <i>[Signature]</i>      | Brandon Fick | ARI     | 10/20/17 1655 |

| Sample ID             | Date       | Time  | Matrix | No. Containers | Notes/Comments                              |
|-----------------------|------------|-------|--------|----------------|---|
| GW-5C21-2-102017      | 10/20/2017 | 14:45 | WATER  | 4              | All dissolved samples field filtered 0.45um |
| GW-5C21-2-102017 (20) |            | 14:45 |        | 4              |   |
| GW-4C2-1-102017       |            | 14:45 |        | 4              |   |
| GW-4C2-1-102017-(20)  |            | 14:45 |        | 4              |   |

ARI Assigned Number: **17J0394**  
 ARI Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Turn-around Requested: **Normal**  
 Phone: **360-570-1700**  
 Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kerner / D Pickering**

Comments/Special Instructions:  
 Submit EDD to PIONEER using PIONEER EDD format  
 Bill to Port of Tacoma  
 PO#79227

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



WORK ORDER

17J0394

**Client:** Pioneer Technologies Corporation      **Project Manager:** Amanda Volgardsen  
**Project:** Port of Tacoma Arkema- FS Data Gap Investigatio      **Project Number:** 79227

**Report To:**  
Pioneer Technologies Corporation  
Troy Bussey Jr.  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503  
Phone: 360-570-1700  
Fax: -

**Invoice To:**  
Port of Tacoma  
Scott Hooten  
One Sitcum Plaza  
Tacoma, WA 98421  
Phone :(253) 383-9428  
Fax:

Date Due: 06-Nov-2017 18:00 (10 day TAT)

Received By: Brandon Fisk

Date Received: 20-Oct-2017 16:55

Logged In By: Amanda Volgardsen

Date Logged In: 20-Oct-2017 17:25

Samples Received at: 9.6°C

|   |  |     |
|---|--|-----|
| Intact, properly signed and dated custody seals attached to outside of cooler(s).....No | Custody papers included with the cooler.....         | Yes |
| Custody papers properly filled out (in, signed, analyses requested, etc).....Yes        | Was a temperature blank included in the cooler.....  | No  |
| Was sufficient ice used (if appropriate).....No   | All bottles sealed in individual plastic bags.....   | No  |
| All bottles arrived in good condition (unbroken).....Yes                                | All bottle labels complete and legible.....          | Yes |
| Number of containers listed on COC match number received.....Yes                        | Bottle labels and tags agree with COC.....           | Yes |
| Correct bottles used for the requested analyses.....Yes                                 | All VOC vials free of air bubbles.....               | No  |
| Analyses/bottles require preservation (attach preservation sheet excluding VOC).Yes     | Sufficient amount of sample sent in each bottle..... | Yes |
| Sample split at ARI.....No  |  |     |

| Analysis | Due | TAT | Expires | Comments |
|----------|-----|-----|---------|----------|
|----------|-----|-----|---------|----------|





WORK ORDER

17J0394

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

| Analysis  | Due               | TAT | Expires           | Comments              |
|---|-------------------|-----|-------------------|-----------------------|
| <b>17J0394-01 GW-6E5-1-102017-(20) [Water] Sampled 20-Oct-2017 09:15 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   | <b>Field Filtered</b> |
| Met Diss 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 09:15 |                       |
| Alkalinity, Bicarbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 09:15 |                       |
| Sulfate, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 09:15 |                       |
| Solids, Total Dissolved EPA 160.1   | 06-Nov-2017 15:00 | 10  | 27-Oct-2017 09:15 |                       |
| Phosphorus, Ortho-P, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 09:15 |                       |
| Organic Carbon, Dissolved SM 5310 B-  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 09:15 |                       |
| Nitrate-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 09:15 |                       |
| Met Diss 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6010C - Si   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6010C - Al   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Alkalinity, Carbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 09:15 |                       |
| Nitrite-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 09:15 |                       |
| Met Diss 6010C - Na   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Chloride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 09:15 |                       |
| Fluoride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 09:15 |                       |
| Bromide, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 09:15 |                       |
| Met Diss 6010C - Ca   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6010C - Fe   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6010C - K  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6010C - Mg   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |
| Met Diss 6010C - Mn   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 09:15 |                       |



WORK ORDER

17J0394

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

| Analysis  | Due               | TAT | Expires           | Comments              |
|---|-------------------|-----|-------------------|-----------------------|
| <b>17J0394-02 GW-6F1-2-102017-(20) [Water] Sampled 20-Oct-2017 10:40 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   | <b>Field Filtered</b> |
| Phosphorus, Ortho-P, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 10:40 |                       |
| Nitrate-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 10:40 |                       |
| Sulfate, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 10:40 |                       |
| Nitrite-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 10:40 |                       |
| Solids, Total Dissolved EPA 160.1   | 06-Nov-2017 15:00 | 10  | 27-Oct-2017 10:40 |                       |
| Met Diss 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 10:40 |                       |
| Met Diss 6010C - K  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6010C - Mg   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6010C - Na   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Organic Carbon, Dissolved SM 5310 B-  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 10:40 |                       |
| Met Diss 6010C - Ca   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6010C - Mn   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Alkalinity, Bicarbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 10:40 |                       |
| Alkalinity, Carbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 10:40 |                       |
| Bromide, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 10:40 |                       |
| Chloride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 10:40 |                       |
| Fluoride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 10:40 |                       |
| Met Diss 6010C - Al   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6010C - Fe   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |
| Met Diss 6010C - Si   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |                       |



WORK ORDER

17J0394

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|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

| Analysis  | Due               | TAT | Expires           | Comments              |
|---|-------------------|-----|-------------------|-----------------------|
| <b>17J0394-03 GW-6F2-1-102017-(20) [Water] Sampled 20-Oct-2017 11:40 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   | <b>Field Filtered</b> |
| Met Diss 6010C - Fe   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Fluoride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 11:40 |                       |
| Alkalinity, Bicarbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 11:40 |                       |
| Met Diss 6010C - Ca   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 6010C - K  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 6010C - Mg   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 11:40 |                       |
| Phosphorus, Ortho-P, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 11:40 |                       |
| Solids, Total Dissolved EPA 160.1   | 06-Nov-2017 15:00 | 10  | 27-Oct-2017 11:40 |                       |
| Sulfate, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 11:40 |                       |
| Alkalinity, Carbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 11:40 |                       |
| Met Diss 6010C - Si   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Bromide, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 11:40 |                       |
| Chloride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 11:40 |                       |
| Met Diss 6010C - Al   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 6010C - Mn   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 6010C - Na   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Met Diss 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |                       |
| Nitrate-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 11:40 |                       |
| Nitrite-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 11:40 |                       |
| Organic Carbon, Dissolved SM 5310 B-  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 11:40 |                       |



WORK ORDER

17J0394

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|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

| Analysis  | Due               | TAT | Expires           | Comments       |
|---|-------------------|-----|-------------------|----------------|
| <b>17J0394-04 GW-5G1-1-102017-(20) [Water] Sampled 20-Oct-2017 12:10 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   | Field Filtered |
| Nitrate-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 12:10 |                |
| Sulfate, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:10 |                |
| Solids, Total Dissolved EPA 160.1   | 06-Nov-2017 15:00 | 10  | 27-Oct-2017 12:10 |                |
| Nitrite-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 12:10 |                |
| Bromide, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:10 |                |
| Organic Carbon, Dissolved SM 5310 B-  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:10 |                |
| Phosphorus, Ortho-P, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 12:10 |                |
| Met Diss 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:10 |                |
| Met Diss 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Met Diss 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Met Diss 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Met Diss 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Alkalinity, Carbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 12:10 |                |
| Met Diss 6010C - K  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Alkalinity, Bicarbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 12:10 |                |
| Met Diss 6010C - Si   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Met Diss 6010C - Fe   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Met Diss 6010C - Mg   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Chloride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:10 |                |
| Fluoride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:10 |                |
| Met Diss 6010C - Al   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Met Diss 6010C - Ca   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Met Diss 6010C - Na   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |
| Met Diss 6010C - Mn   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |                |



WORK ORDER

17J0394

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

| Analysis  | Due               | TAT | Expires           | Comments              |
|---|-------------------|-----|-------------------|-----------------------|
| <b>17J0394-05 GW-6G1-1-102017-(20) [Water] Sampled 20-Oct-2017 12:40 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   | <b>Field Filtered</b> |
| Fluoride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:40 |                       |
| Organic Carbon, Dissolved SM 5310 B-  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:40 |                       |
| Met Diss 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Met Diss 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Met Diss 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Met Diss 6010C - Si   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Met Diss 6010C - Fe   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Alkalinity, Bicarbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 12:40 |                       |
| Met Diss 6010C - Al   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Solids, Total Dissolved EPA 160.1   | 06-Nov-2017 15:00 | 10  | 27-Oct-2017 12:40 |                       |
| Met Diss 6010C - Ca   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Alkalinity, Carbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 12:40 |                       |
| Sulfate, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:40 |                       |
| Nitrite-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 12:40 |                       |
| Nitrate-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 12:40 |                       |
| Met Diss 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:40 |                       |
| Met Diss 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Met Diss 6010C - Na   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Met Diss 6010C - Mn   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Met Diss 6010C - Mg   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Met Diss 6010C - K  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |                       |
| Chloride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:40 |                       |
| Bromide, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:40 |                       |
| Phosphorus, Ortho-P, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 12:40 |                       |



WORK ORDER

17J0394

Client: Pioneer Technologies Corporation

Project Manager: Amanda Volgardsen

Project: Port of Tacoma Arkema- FS Data Gap Investigatio

Project Number: 79227

| Analysis   | Due               | TAT | Expires           | Comments       |
|--|-------------------|-----|-------------------|----------------|
| <b>17J0394-06 GW-5C21-2-102017-(20) [Water] Sampled 20-Oct-2017 14:45<br/>(GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   | Field Filtered |
| Met Diss 6020A - Pb  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Alkalinity, Carbonate SM 2320 B-97   | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 14:45 |                |
| Met Diss 6010C - Fe  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6010C - K   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6010C - Mg  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6020A - Cu UCT  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6020A - Ni UCT  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 7470A Hg  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Solids, Total Dissolved EPA 160.1  | 06-Nov-2017 15:00 | 10  | 27-Oct-2017 14:45 |                |
| Sulfate, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Bromide, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Met Diss 6010C - Ca  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Chloride, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Alkalinity, Bicarbonate SM 2320 B-97   | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 14:45 |                |
| Met Diss 6010C - Al  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6010C - Mn  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Fluoride, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Met Diss 6010C - Na  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6010C - Si  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6020A - As UCT  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Nitrate-N, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 14:45 |                |
| Nitrite-N, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 14:45 |                |
| Organic Carbon, Dissolved SM 5310 B-   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Phosphorus, Ortho-P, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 14:45 |                |





WORK ORDER

17J0394

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

| Analysis  | Due               | TAT | Expires           | Comments       |
|---|-------------------|-----|-------------------|----------------|
| <b>17J0394-07 GW-4C2-1-102017-(20) [Water] Sampled 20-Oct-2017 14:45 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   | Field Filtered |
| Met Diss 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Phosphorus, Ortho-P, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 14:45 |                |
| Organic Carbon, Dissolved SM 5310 B-06  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Nitrite-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 14:45 |                |
| Met Diss 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6010C - Si   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Sulfate, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Met Diss 6010C - Ca   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6010C - Al   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Fluoride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Met Diss 6010C - Na   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 6010C - Mn   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Chloride, IC, EPA 300.0   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Alkalinity, Bicarbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 14:45 |                |
| Alkalinity, Carbonate SM 2320 B-97  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 14:45 |                |
| Bromide, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Met Diss 6010C - Fe   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Met Diss 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |                |
| Met Diss 6010C - Mg   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Solids, Total Dissolved EPA 160.1   | 06-Nov-2017 15:00 | 10  | 27-Oct-2017 14:45 |                |
| Met Diss 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |
| Nitrate-N, IC, EPA 300.0  | 06-Nov-2017 15:00 | 10  | 22-Oct-2017 14:45 |                |
| Met Diss 6010C - K  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |                |

|  |                   |    |                   |
|--|-------------------|----|-------------------|
| <b>17J0394-08 GW-6E5-1-102017 [Water] Sampled 20-Oct-2017 09:15 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |    |                   |
| Met 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10 | 18-Apr-2018 09:15 |
| Met 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10 | 18-Apr-2018 09:15 |
| Met 7470A Hg   | 06-Nov-2017 15:00 | 10 | 17-Nov-2017 09:15 |
| Met 6020A - Pb   | 06-Nov-2017 15:00 | 10 | 18-Apr-2018 09:15 |
| 8260C VOA  | 06-Nov-2017 15:00 | 10 | 03-Nov-2017 09:15 |
| Met 6020A - As UCT   | 06-Nov-2017 15:00 | 10 | 18-Apr-2018 09:15 |



**WORK ORDER**

17J0394

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

| Analysis   | Due               | TAT | Expires           | Comments |
|--|-------------------|-----|-------------------|----------|
| <b>17J0394-09 GW-6F1-2-102017 [Water] Sampled 20-Oct-2017 10:40<br/>(GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   |          |
| Met 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |          |
| 8260C VOA  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 10:40 |          |
| Met 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 10:40 |          |
| Met 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |          |
| Met 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |          |
| Met 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 10:40 |          |
| <b>17J0394-10 GW-6F2-1-102017 [Water] Sampled 20-Oct-2017 11:40<br/>(GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   |          |
| Met 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 11:40 |          |
| Met 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |          |
| Met 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |          |
| Met 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |          |
| 8260C VOA  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 11:40 |          |
| Met 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 11:40 |          |
| <b>17J0394-11 GW-5G1-1-102017 [Water] Sampled 20-Oct-2017 12:10<br/>(GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   |          |
| 8260C VOA  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 12:10 |          |
| Met 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |          |
| Met 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |          |
| Met 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |          |
| Met 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:10 |          |
| Met 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:10 |          |
| <b>17J0394-12 GW-6G1-1-102017 [Water] Sampled 20-Oct-2017 12:40<br/>(GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   |          |
| Met 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |          |
| Met 6020A - Pb   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |          |
| Met 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |          |
| 8260C VOA  | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 12:40 |          |
| Met 6020A - As UCT   | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 12:40 |          |
| Met 7470A Hg   | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 12:40 |          |





WORK ORDER

17J0394

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

| Analysis  | Due               | TAT | Expires           | Comments |
|---|-------------------|-----|-------------------|----------|
| <b>17J0394-13 GW-5C21-2-102017 [Water] Sampled 20-Oct-2017 14:45<br/>(GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   |          |
| 8260C VOA   | 06-Nov-2017 15:00 | 10  | 03-Nov-2017 14:45 |          |
| Met 6020A - Cu UCT  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |          |
| Met 6020A - Ni UCT  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |          |
| Met 6020A - As UCT  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |          |
| Met 6020A - Pb  | 06-Nov-2017 15:00 | 10  | 18-Apr-2018 14:45 |          |
| Met 7470A Hg  | 06-Nov-2017 15:00 | 10  | 17-Nov-2017 14:45 |          |

|  |                   |    |                   |  |
|--|-------------------|----|-------------------|--|
| <b>17J0394-14 GW-4C2-1-102017 [Water] Sampled 20-Oct-2017 14:45<br/>(GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |    |                   |  |
| Met 7470A Hg   | 06-Nov-2017 15:00 | 10 | 17-Nov-2017 14:45 |  |
| 8260C VOA  | 06-Nov-2017 15:00 | 10 | 03-Nov-2017 14:45 |  |
| Met 6020A - As UCT   | 06-Nov-2017 15:00 | 10 | 18-Apr-2018 14:45 |  |
| Met 6020A - Cu UCT   | 06-Nov-2017 15:00 | 10 | 18-Apr-2018 14:45 |  |
| Met 6020A - Ni UCT   | 06-Nov-2017 15:00 | 10 | 18-Apr-2018 14:45 |  |
| Met 6020A - Pb   | 06-Nov-2017 15:00 | 10 | 18-Apr-2018 14:45 |  |



WORK ORDER

17J0394

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: 79227

Preservation Confirmation

| Container ID | Container Type                    | pH |                    |
|--------------|-----------------------------------|----|--------------------|
| 17J0394-01 A | Large OJ, 1000 mL                 |    |                    |
| 17J0394-01 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | Pass               |
| 17J0394-01 C | Small OJ, 500 mL                  |    |                    |
| 17J0394-01 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | Pass               |
| 17J0394-02 A | Large OJ, 1000 mL                 |    |                    |
| 17J0394-02 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | Pass               |
| 17J0394-02 C | Small OJ, 500 mL                  |    |                    |
| 17J0394-02 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | Pass               |
| 17J0394-03 A | Large OJ, 1000 mL                 |    |                    |
| 17J0394-03 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | Pass               |
| 17J0394-03 C | Small OJ, 500 mL                  |    |                    |
| 17J0394-03 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | Pass               |
| 17J0394-04 A | Large OJ, 1000 mL                 |    |                    |
| 17J0394-04 B | Glass NM, Amber, 500 mL, 9N H2SO4 | <2 | Pass               |
| 17J0394-04 C | Small OJ, 500 mL                  |    |                    |
| 17J0394-04 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | Pass               |
| 17J0394-05 A | Large OJ, 1000 mL                 |    |                    |
| 17J0394-05 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | Pass               |
| 17J0394-05 C | Small OJ, 500 mL                  |    |                    |
| 17J0394-05 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | Pass               |
| 17J0394-06 A | Large OJ, 1000 mL                 |    |                    |
| 17J0394-06 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | Pass               |
| 17J0394-06 C | Small OJ, 500 mL                  |    |                    |
| 17J0394-06 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | Pass               |
| 17J0394-07 A | Large OJ, 1000 mL                 |    |                    |
| 17J0394-07 B | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | Pass               |
| 17J0394-07 C | Small OJ, 500 mL                  |    |                    |
| 17J0394-07 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 |                    |
| 17J0394-08 A | VOA Vial, Clear, 40 mL, HCL       |    | 1 small air bubble |
| 17J0394-08 B | VOA Vial, Clear, 40 mL, HCL       |    | 1 small air bubble |
| 17J0394-08 C | VOA Vial, Clear, 40 mL, HCL       |    |                    |





WORK ORDER

17J0394

|  |                             |                                    |      |
|--|-----------------------------|------------------------------------|------|
| Client: Pioneer Technologies Corporation                 |                             | Project Manager: Amanda Volgardsen |      |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                             | Project Number: 79227              |      |
| 17J0394-08 D   | HDPE NM, 500 mL, 1:1 HNO3   | <2                                 | Pass |
| 17J0394-09 A   | VOA Vial, Clear, 40 mL, HCL | 1 large air bubble                 |      |
| 17J0394-09 B   | VOA Vial, Clear, 40 mL, HCL | 2 large air bubbles                |      |
| 17J0394-09 C   | VOA Vial, Clear, 40 mL, HCL | 1 large air bubble                 |      |
| 17J0394-09 D   | HDPE NM, 500 mL, 1:1 HNO3   | <2                                 | Pass |
| 17J0394-10 A   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-10 B   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-10 C   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-10 D   | HDPE NM, 500 mL, 1:1 HNO3   | <2                                 | Pass |
| 17J0394-11 A   | VOA Vial, Clear, 40 mL, HCL | 30 small air bubbles               |      |
| 17J0394-11 B   | VOA Vial, Clear, 40 mL, HCL | 2 small air bubbles                |      |
| 17J0394-11 C   | VOA Vial, Clear, 40 mL, HCL | 2 large air bubbles                |      |
| 17J0394-11 D   | HDPE NM, 500 mL, 1:1 HNO3   | <2                                 |      |
| 17J0394-12 A   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-12 B   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-12 C   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-12 D   | HDPE NM, 500 mL, 1:1 HNO3   | <2                                 | Pass |
| 17J0394-13 A   | VOA Vial, Clear, 40 mL, HCL | 1 large air bubble                 |      |
| 17J0394-13 B   | VOA Vial, Clear, 40 mL, HCL | 1 large air bubble                 |      |
| 17J0394-13 C   | VOA Vial, Clear, 40 mL, HCL | 1 large air bubble                 |      |
| 17J0394-13 D   | HDPE NM, 500 mL, 1:1 HNO3   | <2                                 | Pass |
| 17J0394-14 A   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-14 B   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-14 C   | VOA Vial, Clear, 40 mL, HCL |                                    |      |
| 17J0394-14 D   | HDPE NM, 500 mL, 1:1 HNO3   | <2                                 | Pass |

SBW  
Preservation Confirmed By

10/21/2017  
Date



# Cooler Receipt Form

ARI Client: Pioneer

Project Name: Arkema FS DG Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17J0394

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO

Were custody papers included with the cooler? ..... YES NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time: 1635 9.6 8.2

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: P005206

Cooler Accepted by: BF Date: 10/20/17 Time: 1655

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES NO

Were all bottles sealed in individual plastic bags? ..... YES NO

Did all bottles arrive in good condition (unbroken)? ..... YES NO

Were all bottle labels complete and legible? ..... YES NO

Did the number of containers listed on COC match with the number of containers received? ..... YES NO

Did all bottle labels and tags agree with custody papers? ..... YES NO

Were all bottles used correct for the requested analyses? ..... YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? ..... NA YES NO

Was sufficient amount of sample sent in each bottle? ..... YES NO

Date VOC Trip Blank was made at ARI..... NA

Was Sample Split by ARI: NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

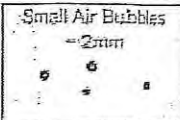
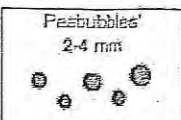
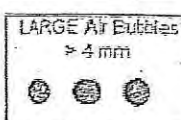
Samples Logged by: JBL Date: 10/21/2017 Time: 0835

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**  
Samples 17J0394-12B & 17J0394-13D have no labels, air bubbles marked on pres sheet.

By: \_\_\_\_\_ Date: \_\_\_\_\_

|   |   |   |                                 |
|---|---|---|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|   |   |   | Peabubbles → "pb" (2 to < 4 mm) |
|   |   |   | Large → "lg" (4 to < 6 mm)      |
|   |   |   | Headspace → "hs" (> 6 mm)       |





**WORK ORDER**

**17J0394**

**Client: Pioneer Technologies Corporation**

**Project Manager: Amanda Volgardsen**

**Project: Port of Tacoma Arkema- FS Data Gap Investigatio**

**Project Number: 79227**

**Report To:**

Pioneer Technologies Corporation  
Troy Bussey Jr.  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503  
Phone: 360-570-1700  
Fax: -

**Invoice To:**

Port of Tacoma  
Scott Hooten  
One Sitcum Plaza  
Tacoma, WA 98421  
Phone :(253) 383-9428  
Fax:

Date Due: 06-Nov-2017 18:00 (10 day TAT)

Received By: Brandon Fisk

Date Received: 20-Oct-2017 16:55

Logged In By: Amanda Volgardsen

Date Logged In: 20-Oct-2017 17:25

**Coolers Received:**

| Cooler: Cooler 1  | Default Cooler | Seal ID:   | Cooler Temp: 9.6 °C |
|---|----------------|--|---------------------|
| Intact, properly signed and dated custody seals at..... | No             | Custody papers included with the cooler.....         | Yes                 |
| Custody papers properly filled out (in, signed, an..... | Yes            | Was a temperature blank included in the cooler.....  | No                  |
| Was sufficient ice used (if appropriate).....           | No             | All bottles sealed in individual plastic bags.....   | No                  |
| All bottles arrived in good condition (unbroken).....   | Yes            | All bottle labels complete and legible.....          | Yes                 |
| Number of containers listed on COC match number re..... | Yes            | Bottle labels and tags agree with COC.....           | Yes                 |
| Correct bottles used for the requested analyses.....    | Yes            | All VOC vials free of air bubbles.....               | No                  |
| Analyses/bottles require preservation (attach pres..... | Yes            | Sufficient amount of sample sent in each bottle..... | Yes                 |
| Sample split at ARI.....                                | No             |  |                     |

**Containers in this cooler:**

|                                  |                                |                                  |
|----------------------------------|--------------------------------|----------------------------------|
| <b>17J0394-01</b>                | <b>"GW-6E5-1-102017-(20)"</b>  | <b>Sampled:20-Oct-2017 09:15</b> |
| 17J0394-01 A (Large OJ, 1000 mL) |                                |                                  |
| <b>17J0394-02</b>                | <b>"GW-6F1-2-102017-(20)"</b>  | <b>Sampled:20-Oct-2017 10:40</b> |
| 17J0394-02 A (Large OJ, 1000 mL) |                                |                                  |
| <b>17J0394-03</b>                | <b>"GW-6F2-1-102017-(20)"</b>  | <b>Sampled:20-Oct-2017 11:40</b> |
| 17J0394-03 A (Large OJ, 1000 mL) |                                |                                  |
| <b>17J0394-04</b>                | <b>"GW-5G1-1-102017-(20)"</b>  | <b>Sampled:20-Oct-2017 12:10</b> |
| 17J0394-04 A (Large OJ, 1000 mL) |                                |                                  |
| <b>17J0394-05</b>                | <b>"GW-6G1-1-102017-(20)"</b>  | <b>Sampled:20-Oct-2017 12:40</b> |
| 17J0394-05 A (Large OJ, 1000 mL) |                                |                                  |
| <b>17J0394-06</b>                | <b>"GW-5C21-2-102017-(20)"</b> | <b>Sampled:20-Oct-2017 14:45</b> |
| 17J0394-06 A (Large OJ, 1000 mL) |                                |                                  |
| <b>17J0394-07</b>                | <b>"GW-4C2-1-102017"</b>       | <b>Sampled:20-Oct-2017 14:45</b> |
| 17J0394-07 A (Large OJ, 1000 mL) |                                |                                  |

*only the ANION & TDS samples have been logged*

wko\_ARI\_login.rpt



**WORK ORDER**

**17J0394**

**Client:** Pioneer Technologies Corporation

**Project Manager:** Amanda Volgardsen

**Project:** Port of Tacoma Arkema- FS Data Gap Investigatio

**Project Number:** 79227

**Cooler: Cooler 2**

**Seal ID:**

**Cooler Temp: 8.2 °C**

|   |     |  |     |
|---|-----|--|-----|
| Intact, properly signed and dated custody seals at..... | No  | Custody papers included with the cooler.....         | Yes |
| Custody papers properly filled out (in, signed, an..... | Yes | Was a temperature blank included in the cooler.....  | No  |
| Was sufficient ice used (if appropriate).....           | No  | All bottles sealed in individual plastic bags.....   | No  |
| All bottles arrived in good condition (unbroken).....   | Yes | All bottle labels complete and legible.....          | Yes |
| Number of containers listed on COC match number re..... | Yes | Bottle labels and tags agree with COC.....           | Yes |
| Correct bottles used for the requested analyses.....    | Yes | All VOC vials free of air bubbles.....               | No  |
| Analyses/bottles require preservation (attach pres..... | Yes | Sufficient amount of sample sent in each bottle..... | Yes |
| Sample split at ARI.....                                | No  |  |     |

**Containers in this cooler:**

**Sampled:**

Reviewed By \_\_\_\_\_

Date \_\_\_\_\_

Page 2 of 4

wko\_ARI\_login.rpt



**WORK ORDER**

**17J0394**

**Client: Pioneer Technologies Corporation**

**Project Manager: Amanda Volgardsen**

**Project: Port of Tacoma Arkema- FS Data Gap Investigatio**

**Project Number: 79227**

**Analyses Logged:**

| Labnumber: 17J0394-01             | Sample Name: GW-6E5-1-102017-(20) | Sampled: 10/20/2017 | Received: 10/20/2017  |
|-----------------------------------|-----------------------------------|---------------------|-----------------------|
| Analysis                          | Hold Time                         | Hold Type           | Date Expires Date Due |
| Bromide, IC, EPA 300.0            | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Chloride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Fluoride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Nitrate-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Nitrite-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Solids, Total Dissolved EPA 160.1 | 7 Days                            | Sampled to Analyzed | 10/27/2017 11/06/2017 |

| Labnumber: 17J0394-02             | Sample Name: GW-6F1-2-102017-(20) | Sampled: 10/20/2017 | Received: 10/20/2017  |
|-----------------------------------|-----------------------------------|---------------------|-----------------------|
| Analysis                          | Hold Time                         | Hold Type           | Date Expires Date Due |
| Bromide, IC, EPA 300.0            | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Chloride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Fluoride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Nitrate-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Nitrite-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Solids, Total Dissolved EPA 160.1 | 7 Days                            | Sampled to Analyzed | 10/27/2017 11/06/2017 |

| Labnumber: 17J0394-03             | Sample Name: GW-6F2-1-102017-(20) | Sampled: 10/20/2017 | Received: 10/20/2017  |
|-----------------------------------|-----------------------------------|---------------------|-----------------------|
| Analysis                          | Hold Time                         | Hold Type           | Date Expires Date Due |
| Bromide, IC, EPA 300.0            | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Chloride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Fluoride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Nitrate-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Nitrite-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Solids, Total Dissolved EPA 160.1 | 7 Days                            | Sampled to Analyzed | 10/27/2017 11/06/2017 |

| Labnumber: 17J0394-04             | Sample Name: GW-5G1-1-102017-(20) | Sampled: 10/20/2017 | Received: 10/20/2017  |
|-----------------------------------|-----------------------------------|---------------------|-----------------------|
| Analysis                          | Hold Time                         | Hold Type           | Date Expires Date Due |
| Bromide, IC, EPA 300.0            | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Chloride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Fluoride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Nitrate-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Nitrite-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Solids, Total Dissolved EPA 160.1 | 7 Days                            | Sampled to Analyzed | 10/27/2017 11/06/2017 |

| Labnumber: 17J0394-05             | Sample Name: GW-6G1-1-102017-(20) | Sampled: 10/20/2017 | Received: 10/20/2017  |
|-----------------------------------|-----------------------------------|---------------------|-----------------------|
| Analysis                          | Hold Time                         | Hold Type           | Date Expires Date Due |
| Bromide, IC, EPA 300.0            | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Chloride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Fluoride, IC, EPA 300.0           | 28 Days                           | Sampled to Analyzed | 11/17/2017 11/06/2017 |
| Nitrate-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Nitrite-N, IC, EPA 300.0          | 2 Days                            | Sampled to Analyzed | 10/22/2017 11/06/2017 |
| Solids, Total Dissolved EPA 160.1 | 7 Days                            | Sampled to Analyzed | 10/27/2017 11/06/2017 |

Reviewed By \_\_\_\_\_

Date \_\_\_\_\_



**WORK ORDER**

**17J0394**

**Client: Pioneer Technologies Corporation**

**Project Manager: Amanda Volgardsen**

**Project: Port of Tacoma Arkema- FS Data Gap Investigatio**

**Project Number: 79227**

| Labnumber: 17J0394-06             | Sample Name: GW-5C21-2-102017-(20) | Sampled: 10/20/2017 | Received: 10/20/2017 |
|-----------------------------------|------------------------------------|---------------------|----------------------|
| Analysis                          | Hold Time                          | Hold Type           | Date Expires         |
| Bromide, IC, EPA 300.0            | 28 Days                            | Sampled to Analyzed | 11/17/2017           |
| Chloride, IC, EPA 300.0           | 28 Days                            | Sampled to Analyzed | 11/17/2017           |
| Fluoride, IC, EPA 300.0           | 28 Days                            | Sampled to Analyzed | 11/17/2017           |
| Nitrate-N, IC, EPA 300.0          | 2 Days                             | Sampled to Analyzed | 10/22/2017           |
| Nitrite-N, IC, EPA 300.0          | 2 Days                             | Sampled to Analyzed | 10/22/2017           |
| Solids, Total Dissolved EPA 160.1 | 7 Days                             | Sampled to Analyzed | 10/27/2017           |

| Labnumber: 17J0394-07             | Sample Name: GW-4C2-1-102017 | Sampled: 10/20/2017 | Received: 10/20/2017 |
|-----------------------------------|------------------------------|---------------------|----------------------|
| Analysis                          | Hold Time                    | Hold Type           | Date Expires         |
| Bromide, IC, EPA 300.0            | 28 Days                      | Sampled to Analyzed | 11/17/2017           |
| Chloride, IC, EPA 300.0           | 28 Days                      | Sampled to Analyzed | 11/17/2017           |
| Fluoride, IC, EPA 300.0           | 28 Days                      | Sampled to Analyzed | 11/17/2017           |
| Nitrate-N, IC, EPA 300.0          | 2 Days                       | Sampled to Analyzed | 10/22/2017           |
| Nitrite-N, IC, EPA 300.0          | 2 Days                       | Sampled to Analyzed | 10/22/2017           |
| Solids, Total Dissolved EPA 160.1 | 7 Days                       | Sampled to Analyzed | 10/27/2017           |

Reviewed By \_\_\_\_\_

Date \_\_\_\_\_





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID             | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-----------------------|---------------|--------|-------------------|-------------------|
| GW-6E5-1-102017-(20)  | 17J0394-01    | Water  | 20-Oct-2017 09:15 | 20-Oct-2017 16:55 |
| GW-6F1-2-102017-(20)  | 17J0394-02    | Water  | 20-Oct-2017 10:40 | 20-Oct-2017 16:55 |
| GW-6F2-1-102017-(20)  | 17J0394-03    | Water  | 20-Oct-2017 11:40 | 20-Oct-2017 16:55 |
| GW-5G1-1-102017-(20)  | 17J0394-04    | Water  | 20-Oct-2017 12:10 | 20-Oct-2017 16:55 |
| GW-6G1-1-102017-(20)  | 17J0394-05    | Water  | 20-Oct-2017 12:40 | 20-Oct-2017 16:55 |
| GW-5C21-2-102017-(20) | 17J0394-06    | Water  | 20-Oct-2017 14:45 | 20-Oct-2017 16:55 |
| GW-4C2-1-102017-(20)  | 17J0394-07    | Water  | 20-Oct-2017 14:45 | 20-Oct-2017 16:55 |
| GW-6E5-1-102017       | 17J0394-08    | Water  | 20-Oct-2017 09:15 | 20-Oct-2017 16:55 |
| GW-6F1-2-102017       | 17J0394-09    | Water  | 20-Oct-2017 10:40 | 20-Oct-2017 16:55 |
| GW-6F2-1-102017       | 17J0394-10    | Water  | 20-Oct-2017 11:40 | 20-Oct-2017 16:55 |
| GW-5G1-1-102017       | 17J0394-11    | Water  | 20-Oct-2017 12:10 | 20-Oct-2017 16:55 |
| GW-6G1-1-102017       | 17J0394-12    | Water  | 20-Oct-2017 12:40 | 20-Oct-2017 16:55 |
| GW-5C21-2-102017      | 17J0394-13    | Water  | 20-Oct-2017 14:45 | 20-Oct-2017 16:55 |
| GW-4C2-1-102017       | 17J0394-14    | Water  | 20-Oct-2017 14:45 | 20-Oct-2017 16:55 |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 20, 2017 under ARI workorder 17J0394. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-6E5-1-102017. The matrix spike percent recovery and duplicate RPD were within QC limits.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

### Dissolved Metals - EPA Method 6010C



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFJ0881 has Sodium and Iron detected below the reporting limits, but above the method detection limits. The Sodium and Iron have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

#### **Anions - EPA Method 300.0**

The samples were analyzed within the recommended holding times.

Due to Sulfate matrix interference samples were ran at different dilutions as well as method 375.2 in addition to 300.0. The matrix interference makes the Sulfate results suspect and the results should be regarded as such. All of the dilutions and runs were reported.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-6E5-1-102017-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits. The matrix spike has a Bromide concentration that exceeds the upper calibration limit. The Bromide has been flagged with an "E" qualifier on the matrix spike. No further corrective action was taken.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

A duplicate was prepared in conjunction with sample GW-6E5-1-102014-(20). The duplicate RPD was within QC limits.

**Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/20/2017 09:15  
Analyzed: 03-Nov-2017 15:14

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | 27.7   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | 25.2   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | 24.3   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | 0.287  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | 16.3   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | 43.0   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | 926    | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 09:15  
Analyzed: 07-Nov-2017 16:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 200      | 13.6            | 20.0            | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 09:15  
Analyzed: 07-Nov-2017 16:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 200      | 4.40            | 40.0            | <b>29100</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>0.380</b> | ug/L  | J     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.805</b> | ug/L  |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 09:15  
Analyzed: 02-Nov-2017 15:15

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/20/2017 09:15  
Analyzed: 24-Oct-2017 08:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0684 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>2770</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 09:15  
Analyzed: 21-Oct-2017 01:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.490</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.13</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.43</b> | mg-P/L |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/20/2017 09:15  
Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>804</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>804</b> | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/20/2017 09:15  
Analyzed: 05-Nov-2017 07:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>23.4</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 09:15  
Analyzed: 24-Oct-2017 09:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>14.8</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017-(20)**  
**17J0394-01RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 09:15  
Analyzed: 24-Oct-2017 13:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>1170</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/20/2017 10:40  
Analyzed: 02-Nov-2017 21:03

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | 328    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | 211    | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | 720    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | 3.13   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | 254    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | 23.4   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | 5520   | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 10:40  
Analyzed: 07-Nov-2017 15:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Number: 79227  
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Reported:  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 10:40  
Analyzed: 07-Nov-2017 15:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>1.92</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 10       | 3.40            | 5.00            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 10       | 0.500           | 5.00            | ND          | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 10:40  
Analyzed: 02-Nov-2017 15:17

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/20/2017 10:40  
Analyzed: 24-Oct-2017 08:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0684 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>16400</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 10:40  
Analyzed: 21-Oct-2017 02:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/20/2017 10:40

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 895    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 895    | mg/L CaCO3 |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/20/2017 10:40  
Analyzed: 05-Nov-2017 07:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>34.0</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 10:40  
Analyzed: 24-Oct-2017 10:40

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>9.59</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.562</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 10:40  
Analyzed: 24-Oct-2017 14:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>10800</b> | mg/L  | D     |





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Olympia WA, 98503

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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017-(20)**  
**17J0394-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 10:40  
Analyzed: 25-Oct-2017 22:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | <b>6.99</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/20/2017 11:40  
Analyzed: 02-Nov-2017 21:12

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0134</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>15.0</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0516</b> | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>5.73</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0017</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>1.32</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>7.51</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>81.9</b>   | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 11:40  
Analyzed: 07-Nov-2017 15:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.237</b> | ug/L  |       |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 11:40  
Analyzed: 07-Nov-2017 15:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>64.4</b> | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.350           | 0.500           | <b>54.7</b> | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>4.88</b> | ug/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 11:40  
Analyzed: 02-Nov-2017 15:19

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000160</b> | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/20/2017 11:40  
Analyzed: 24-Oct-2017 08:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0684 Sample Size: 100 mL  
Prepared: 24-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>291</b> | mg/L  |       |



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Reported:  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 11:40  
Analyzed: 21-Oct-2017 02:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.438</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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Reported:  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/20/2017 11:40

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 89.3   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 89.3   | mg/L CaCO3 |       |





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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/20/2017 11:40  
Analyzed: 05-Nov-2017 08:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>20.0</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-6F2-1-102017-(20)**  
**17J0394-03RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 11:40  
Analyzed: 24-Oct-2017 10:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 50       | 5.00            | <b>59.3</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | <b>74.4</b> | mg/L  | D     |



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Reported:  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/20/2017 12:10  
Analyzed: 02-Nov-2017 21:29

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.520</b>  | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>3.70</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>4.15</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.821</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0671</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>12.9</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>32.7</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>1350</b>   | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 12:10  
Analyzed: 07-Nov-2017 15:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | 2.57   | ug/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 12:10  
Analyzed: 07-Nov-2017 15:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>526</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>22.6</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>11.7</b> | ug/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 12:10  
Analyzed: 02-Nov-2017 15:20

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/20/2017 12:10  
Analyzed: 24-Oct-2017 08:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0684 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>3350</b> | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 12:10  
Analyzed: 21-Oct-2017 03:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.741</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |





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Reported:  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/20/2017 12:10

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 837    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 837    | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/20/2017 12:10  
Analyzed: 05-Nov-2017 09:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5.47     | 2.74            | <b>167</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 12:10  
Analyzed: 21-Oct-2017 13:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>2.80</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 0.20            | <b>4.16</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2        | 0.200           | <b>4.44</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017-(20)**  
**17J0394-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 12:10  
Analyzed: 24-Oct-2017 14:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1470</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/20/2017 12:40  
Analyzed: 02-Nov-2017 21:16

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0270</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>0.381</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0915</b> | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.0615</b> | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0018</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>1.61</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>10.6</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>158</b>    | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 12:40  
Analyzed: 07-Nov-2017 15:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | <b>0.374</b> | ug/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 12:40  
Analyzed: 07-Nov-2017 15:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>295</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>15.2</b> | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>11.9</b> | ug/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 12:40  
Analyzed: 02-Nov-2017 15:22

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/20/2017 12:40  
Analyzed: 24-Oct-2017 08:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0684 Sample Size: 100 mL  
Prepared: 24-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>416</b> | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 12:40  
Analyzed: 21-Oct-2017 03:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.302</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>0.230</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.57</b> | mg-P/L |       |



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Reported:  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/20/2017 12:40  
Analyzed: 25-Oct-2017 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734 Sample Size: 100 mL  
Prepared: 25-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 87.1   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 33.5   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 121    | mg/L CaCO3 |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/20/2017 12:40  
Analyzed: 05-Nov-2017 09:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 17.2   | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 12:40  
Analyzed: 24-Oct-2017 11:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>32.5</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 12:40  
Analyzed: 24-Oct-2017 15:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 100      | 10.0            | <b>126</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017-(20)**  
**17J0394-05RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 12:40  
Analyzed: 25-Oct-2017 19:40

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>2.50</b> | mg/L  | D     |



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Reported:  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 21:08

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | <b>0.0657</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>66.1</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>125</b>    | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>146</b>    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>1.18</b>   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>123</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>27.5</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>4500</b>   | mg/L  | D     |





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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 14:45  
Analyzed: 07-Nov-2017 16:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 14:45  
Analyzed: 07-Nov-2017 16:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>1680</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 10       | 3.40            | 5.00            | <b>6.79</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>5.06</b> | ug/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 15:23

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/20/2017 14:45  
Analyzed: 24-Oct-2017 08:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0684 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>11600</b> | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 21-Oct-2017 04:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | <b>1.64</b> | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06 (Water)**

**Wet Chemistry**

Method: EPA 375.2  
Instrument: LCHAT1

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 15:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049 Sample Size: 10 mL  
Prepared: 02-Nov-2017 Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 2000            | ND     | mg/L  | U     |



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Reported:  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/20/2017 14:45  
Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1070</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1070</b> | mg/L CaCO3 |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 21-Oct-2017 14:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>2.87</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 0.20            | <b>2.91</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2        | 0.200           | <b>2.38</b> | mg/L  | D     |





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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 375.2  
Instrument: LCHAT1

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 16:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049  
Prepared: 02-Nov-2017

Sample Size: 10 mL  
Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 200             | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 24-Oct-2017 11:39

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>9.71</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>3.67</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 375.2  
Instrument: LCHAT1

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 17:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049 Sample Size: 10 mL  
Prepared: 02-Nov-2017 Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 10.0            | 12.5   | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 25-Oct-2017 22:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>104</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE3 (Water)**

**Wet Chemistry**

Method: EPA 375.2  
Instrument: LCHAT1

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 17:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049 Sample Size: 10 mL  
Prepared: 02-Nov-2017 Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2        | 4.00            | <b>9.09</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE3 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/20/2017 14:45  
Analyzed: 14-Nov-2017 23:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>120</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 25-Oct-2017 23:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>6230</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 5000     | 500             | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE4 (Water)**

**Wet Chemistry**

Method: EPA 375.2  
Instrument: LCHAT1

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 17:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0049 Sample Size: 10 mL  
Prepared: 02-Nov-2017 Final Volume: 10 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 2.00            | <b>9.01</b> | mg/L  |       |





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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017-(20)**  
**17J0394-06RE5 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 26-Oct-2017 22:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>11.5</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 21:21

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0881  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0228</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>0.764</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.204</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.178</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0086</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>7.47</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>59.9</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>454</b>    | mg/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 14:45  
Analyzed: 07-Nov-2017 15:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>1.76</b> | ug/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 14:45  
Analyzed: 07-Nov-2017 15:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>13.2</b> | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>2.47</b> | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>1.31</b> | ug/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 15:31

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/20/2017 14:45  
Analyzed: 24-Oct-2017 08:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0684 Sample Size: 75 mL  
Prepared: 24-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>1250</b> | mg/L  |       |



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Reported:  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 21-Oct-2017 04:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.736</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.82</b> | mg-P/L |       |



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Reported:  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/20/2017 14:45

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 11:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0734  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 171    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 417    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 589    | mg/L CaCO3 |       |





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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 24-Oct-2017 11:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>19.5</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 24-Oct-2017 12:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619 Sample Size: 5 mL  
Prepared: 20-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 2        | 0.200           | <b>2.02</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07RE2 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/20/2017 14:45  
Analyzed: 13-Nov-2017 23:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0655 Sample Size: 20 mL  
Prepared: 23-Oct-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>11.8</b> | mg/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017-(20)**  
**17J0394-07RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/20/2017 14:45  
Analyzed: 24-Oct-2017 15:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0619  
Prepared: 20-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>286</b> | mg/L  | D     |



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Reported:  
15-Nov-2017 18:02

**GW-6E5-1-102017**  
**17J0394-08 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/20/2017 09:15  
Analyzed: 23-Oct-2017 15:22

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.11</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 97.4 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 96.7 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 100 %  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017**  
**17J0394-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 09:15  
Analyzed: 06-Nov-2017 19:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.953</b> | ug/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017**  
**17J0394-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 09:15  
Analyzed: 07-Nov-2017 16:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 200      | 4.40            | 40.0            | <b>30400</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>1.73</b>  | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>1.41</b>  | ug/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-6E5-1-102017**  
**17J0394-08 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 09:15  
Analyzed: 02-Nov-2017 13:43

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0683 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

**GW-6F1-2-102017**  
**17J0394-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/20/2017 10:40  
Analyzed: 23-Oct-2017 15:47

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 100   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.5  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102   | %     |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017**  
**17J0394-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 10:40  
Analyzed: 07-Nov-2017 15:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017**  
**17J0394-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 10:40  
Analyzed: 07-Nov-2017 15:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 10       | 0.220           | 2.00            | <b>2.60</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 10       | 3.40            | 5.00            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>0.520</b> | ug/L  | J, D  |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 18:02

**GW-6F1-2-102017**  
**17J0394-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 10:40  
Analyzed: 02-Nov-2017 13:48

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0683 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
15-Nov-2017 18:02

**GW-6F2-1-102017**  
**17J0394-10 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/20/2017 11:40  
Analyzed: 23-Oct-2017 16:13

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 97.6 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.0 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 94.7 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101 %  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6F2-1-102017**  
**17J0394-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 11:40  
Analyzed: 06-Nov-2017 19:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.581</b> | ug/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6F2-1-102017**  
**17J0394-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 11:40  
Analyzed: 06-Nov-2017 19:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>60.0</b> | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.350           | 0.500           | <b>61.5</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>5.20</b> | ug/L  |       |



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Olympia WA, 98503

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**Reported:**  
15-Nov-2017 18:02

**GW-6F2-1-102017**  
**17J0394-10 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 11:40  
Analyzed: 02-Nov-2017 13:50

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0683 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000220</b> | mg/L  |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
15-Nov-2017 18:02

**GW-5G1-1-102017**  
**17J0394-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/20/2017 12:10  
Analyzed: 23-Oct-2017 16:38

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 93.2  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 95.2  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017**  
**17J0394-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 12:10  
Analyzed: 06-Nov-2017 19:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 2        | 0.136           | 0.200           | <b>2.43</b> | ug/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017**  
**17J0394-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 12:10  
Analyzed: 06-Nov-2017 19:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>465</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 2        | 0.700           | 1.00            | <b>23.0</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>13.1</b> | ug/L  | D     |



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**Reported:**  
15-Nov-2017 18:02

**GW-5G1-1-102017**  
**17J0394-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 12:10  
Analyzed: 02-Nov-2017 13:51

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0683 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
15-Nov-2017 18:02

**GW-6G1-1-102017**  
**17J0394-12 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/20/2017 12:40  
Analyzed: 23-Oct-2017 17:04

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 96.6 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.7 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 95.5 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101 %  |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017**  
**17J0394-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 12:40  
Analyzed: 06-Nov-2017 19:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>21.4</b> | ug/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017**  
**17J0394-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 12:40  
Analyzed: 06-Nov-2017 19:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>261</b>  | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>69.1</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>111</b>  | ug/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-6G1-1-102017**  
**17J0394-12 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 12:40  
Analyzed: 02-Nov-2017 13:53

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0683 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

**GW-5C21-2-102017**  
**17J0394-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/20/2017 14:45  
Analyzed: 23-Oct-2017 17:30

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>3.21</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b>     | ug/L          | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.27</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>93.8 %</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>97.8 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>96.0 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>103 %</i>  |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017**  
**17J0394-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 14:45  
Analyzed: 07-Nov-2017 15:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017**  
**17J0394-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 14:45  
Analyzed: 07-Nov-2017 15:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 10       | 0.220           | 2.00            | <b>2650</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 10       | 3.40            | 5.00            | <b>6.15</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>4.50</b> | ug/L  | J, D  |



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**Reported:**  
15-Nov-2017 18:02

**GW-5C21-2-102017**  
**17J0394-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 13:58

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0683 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
15-Nov-2017 18:02

**GW-4C2-1-102017**  
**17J0394-14 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/20/2017 14:45  
Analyzed: 23-Oct-2017 17:55

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0653 Sample Size: 10 mL  
Prepared: 23-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.41</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.22</b> | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>3.14</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.32</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 96.0  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.5  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 95.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 98.9  | %     |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017**  
**17J0394-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/20/2017 14:45  
Analyzed: 06-Nov-2017 19:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>2.33</b> | ug/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017**  
**17J0394-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/20/2017 14:45  
Analyzed: 06-Nov-2017 19:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0801 Sample Size: 25 mL  
Prepared: 27-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>12.9</b> | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>3.54</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>1.56</b> | ug/L  |       |



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**Reported:**  
15-Nov-2017 18:02

**GW-4C2-1-102017**  
**17J0394-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/20/2017 14:45  
Analyzed: 02-Nov-2017 14:00

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0683 Sample Size: 20 mL  
Prepared: 24-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Reported:  
15-Nov-2017 18:02

### Volatile Organic Compounds - Quality Control

#### Batch BFJ0653 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0653-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 10:39 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.66            |                 | ug/L  | 5.00        |   | 93.1 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.89            |                 | ug/L  | 5.00        |   | 97.9 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.80            |                 | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.96            |                 | ug/L  | 5.00        |   | 99.3 | 80-120      |      |           |       |
| <b>LCS (BFJ0653-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 08:33 |      |             |      |           |       |
| Vinyl Chloride                           | 10.7   | 0.06            | 0.20            | ug/L  | 10.0        |   | 107  | 66-133      |      |           |       |
| Chloroform                               | 9.97   | 0.03            | 0.20            | ug/L  | 10.0        |   | 99.7 | 80-122      |      |           |       |
| Trichloroethene                          | 9.70   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.0 | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.0   | 0.05            | 0.20            | ug/L  | 10.0        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.86            |                 | ug/L  | 5.00        |   | 97.2 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.51            |                 | ug/L  | 5.00        |   | 90.2 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.80            |                 | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.95            |                 | ug/L  | 5.00        |   | 99.0 | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0653-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 23-Oct-2017 Analyzed: 23-Oct-2017 08:58 |      |             |      |           |       |
| Vinyl Chloride                           | 10.2   | 0.06            | 0.20            | ug/L  | 10.0        |   | 102  | 66-133      | 4.94 | 30        |       |
| Chloroform                               | 9.42   | 0.03            | 0.20            | ug/L  | 10.0        |   | 94.2 | 80-122      | 5.67 | 30        |       |
| Trichloroethene                          | 9.69   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.9 | 80-120      | 0.08 | 30        |       |
| Tetrachloroethene                        | 9.91   | 0.05            | 0.20            | ug/L  | 10.0        |   | 99.1 | 80-120      | 1.24 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.93            |                 | ug/L  | 5.00        |   | 98.7 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.45            |                 | ug/L  | 5.00        |   | 89.0 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.06            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.77            |                 | ug/L  | 5.00        |   | 95.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.90            |                 | ug/L  | 5.00        |   | 98.0 | 80-120      |      |           |       |



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Reported:  
15-Nov-2017 18:02

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0683 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit           | Units | Spike Level                                       | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-------|---|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0683-BLK1)</b>       |         |                           |       |   |   |      |             |     |           |       |
|                                   |         |                           |       |   | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:40 |      |             |     |           |       |
| Mercury                           | ND      | 0.000100                  | mg/L  |   |   |      |             |     |           | U     |
| <b>LCS (BFJ0683-BS1)</b>          |         |                           |       |   |   |      |             |     |           |       |
|                                   |         |                           |       |   | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:42 |      |             |     |           |       |
| Mercury                           | 0.00226 | 0.000100                  | mg/L  | 0.00200   |   | 113  | 80-120      |     |           |       |
| <b>Duplicate (BFJ0683-DUP1)</b>   |         |                           |       |   |   |      |             |     |           |       |
|                                   |         | <b>Source: 17J0394-08</b> |       | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:45 |   |      |             |     |           |       |
| Mercury                           | ND      | 0.000100                  | mg/L  |   | ND  |      |             |     |           | U     |
| <b>Matrix Spike (BFJ0683-MS1)</b> |         |                           |       |   |   |      |             |     |           |       |
|                                   |         | <b>Source: 17J0394-08</b> |       | Prepared: 24-Oct-2017 Analyzed: 02-Nov-2017 13:46 |   |      |             |     |           |       |
| Mercury                           | 0.00124 | 0.000100                  | mg/L  | 0.00100   | ND  | 121  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Reported:  
15-Nov-2017 18:02

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0801 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS1 Analyst: TCH

| QC Sample/Analyte           | Isotope | Result | Detection Limit                                   | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|---|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0801-BLK1)</b> |         |        | Prepared: 27-Oct-2017 Analyzed: 02-Nov-2017 15:23 |                 |       |             |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680  | 0.100           | ug/L  |             |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220  | 0.200           | ug/L  |             |               |      |             |     |           | U     |
| Copper                      | 63      | ND     | 0.340   | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350   | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Nickel                      | 60      | ND     | 0.0500  | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| Nickel                      | 62      | ND     | 0.220   | 0.500           | ug/L  |             |               |      |             |     |           | U     |
| <b>LCS (BFJ0801-BS1)</b>    |         |        | Prepared: 27-Oct-2017 Analyzed: 02-Nov-2017 15:59 |                 |       |             |               |      |             |     |           |       |
| Lead                        | 208     | 25.8   | 0.0680  | 0.100           | ug/L  | 25.0        |               | 103  | 80-120      |     |           |       |
| Arsenic                     | 75a     | 25.1   | 0.0220  | 0.200           | ug/L  | 25.0        |               | 101  | 80-120      |     |           |       |
| Copper                      | 63      | 27.2   | 0.340   | 0.500           | ug/L  | 25.0        |               | 109  | 80-120      |     |           |       |
| Copper                      | 65      | 27.0   | 0.350   | 0.500           | ug/L  | 25.0        |               | 108  | 80-120      |     |           |       |
| Nickel                      | 60      | 26.4   | 0.0500  | 0.500           | ug/L  | 25.0        |               | 106  | 80-120      |     |           |       |
| Nickel                      | 62      | 27.0   | 0.220   | 0.500           | ug/L  | 25.0        |               | 108  | 80-120      |     |           |       |



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Reported:  
15-Nov-2017 18:02

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0881 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0881-BLK1)</b> |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 31-Oct-2017 Analyzed: 01-Nov-2017 19:39 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0033 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.372  | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFJ0881-BS1)</b> |       |        |        |      |       |   |      |        |  |  |   |
|                          |       |        |        |      |       | Prepared: 31-Oct-2017 Analyzed: 01-Nov-2017 19:56 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.01  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 100  | 80-120 |  |  |   |
| Calcium, Dissolved       | 9.45  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 94.5 | 80-120 |  |  |   |
| Iron, Dissolved          | 2.03  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 101  | 80-120 |  |  |   |
| Magnesium, Dissolved     | 10.2  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 102  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.497 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 99.4 | 80-120 |  |  |   |
| Potassium, Dissolved     | 8.98  | 0.0520 | 0.500  | mg/L | 10.0  |   | 89.8 | 80-120 |  |  |   |
| Silicon, Dissolved       | 9.90  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 99.0 | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.89  | 0.0114 | 0.500  | mg/L | 10.0  |   | 98.9 | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.8  | 1.90   | 50.0   | mg/L | 10.0  |   | 108  | 80-120 |  |  | J |



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Reported:  
15-Nov-2017 18:02

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0037 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0037-BLK1)</b> |         |        |                 |                 |       | Prepared: 02-Nov-2017 Analyzed: 06-Nov-2017 18:41 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic, Dissolved          | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0037-BS1)</b>    |         |        |                 |                 |       | Prepared: 02-Nov-2017 Analyzed: 06-Nov-2017 19:02 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | 26.1   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 104  | 80-120      |     |           |       |
| Arsenic, Dissolved          | 75a     | 28.2   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 113  | 80-120      |     |           |       |
| Copper, Dissolved           | 63      | 27.7   | 0.340           | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Copper, Dissolved           | 65      | 28.4   | 0.350           | 0.500           | ug/L  | 25.0  |               | 114  | 80-120      |     |           |       |
| Nickel, Dissolved           | 60      | 27.3   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 109  | 80-120      |     |           |       |
| Nickel, Dissolved           | 62      | 27.5   | 0.220           | 0.500           | ug/L  | 25.0  |               | 110  | 80-120      |     |           |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0039 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0039-BLK1)</b> |         |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:12 |      |             |     |           |       |
| Mercury, Dissolved          | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0039-BS1)</b>    |         |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:14 |      |             |     |           |       |
| Mercury, Dissolved          | 0.00236 | 0.000100        | mg/L  | 0.00200     |   | 118  | 80-120      |     |           |       |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Nov-2017 18:02

Wet Chemistry - Quality Control

Batch BFJ0619 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0619-BLK1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 20-Oct-2017 Analyzed: 21-Oct-2017 00:35                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| <b>LCS (BFJ0619-BS1)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 20-Oct-2017 Analyzed: 21-Oct-2017 00:54                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.47   | 0.100           | mg/L   | 1.50        |               | 97.8 | 90-110      |      |           |       |
| Chloride  | 1.51   | 0.100           | mg/L   | 1.50        |               | 101  | 90-110      |      |           |       |
| Fluoride  | 1.53   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| Nitrate-N   | 1.53   | 0.100           | mg-N/L | 1.50        |               | 102  | 90-110      |      |           |       |
| Nitrite-N   | 1.54   | 0.100           | mg-N/L | 1.50        |               | 103  | 90-110      |      |           |       |
| Orthophosphorus   | 1.49   | 0.10            | mg-P/L | 1.50        |               | 99.5 | 90-110      |      |           |       |
| Sulfate   | 1.53   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0619-DUP1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0394-01 Prepared: 20-Oct-2017 Analyzed: 21-Oct-2017 01:34    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 0.497  | 0.100           | mg/L   |             | 0.490         |      |             | 1.42 | 20        |       |
| Fluoride  | 1.13   | 0.100           | mg/L   |             | 1.13          |      |             | 0.18 | 20        |       |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Orthophosphorus   | 0.44   | 0.10            | mg-P/L |             | 0.43          |      |             | 1.86 | 20        |       |
| <b>Duplicate (BFJ0619-DUP2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0394-01RE1 Prepared: 20-Oct-2017 Analyzed: 24-Oct-2017 09:41 |        |                 |        |             |               |      |             |      |           |       |
| Sulfate   | 15.7   | 1.00            | mg/L   |             | 14.8          |      |             | 6.05 | 20        | D     |
| <b>Duplicate (BFJ0619-DUP3)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0394-01RE2 Prepared: 20-Oct-2017 Analyzed: 24-Oct-2017 13:41 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 1170   | 50.0            | mg/L   |             | 1170          |      |             | 0.29 | 20        | D     |
| <b>Matrix Spike (BFJ0619-MS1)</b>                                       |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0394-01 Prepared: 20-Oct-2017 Analyzed: 21-Oct-2017 01:53    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 2.50   | 0.100           | mg/L   | 2.00        | 0.490         | 101  | 75-125      |      |           | E     |
| Nitrate-N   | 2.13   | 0.100           | mg-N/L | 2.00        | ND            | 107  | 75-125      |      |           |       |
| Nitrite-N   | 1.95   | 0.100           | mg-N/L | 2.00        | ND            | 97.6 | 75-125      |      |           |       |
| Orthophosphorus   | 2.51   | 0.10            | mg-P/L | 2.00        | 0.43          | 104  | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Reported:  
15-Nov-2017 18:02

### Wet Chemistry - Quality Control

#### Batch BFJ0619 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**Matrix Spike (BFJ0619-MS2)** Source: 17J0394-01RE1 Prepared: 20-Oct-2017 Analyzed: 24-Oct-2017 10:00

|         |      |      |      |      |      |      |        |  |  |   |
|---------|------|------|------|------|------|------|--------|--|--|---|
| Sulfate | 34.1 | 2.00 | mg/L | 20.0 | 14.8 | 96.8 | 75-125 |  |  | D |
|---------|------|------|------|------|------|------|--------|--|--|---|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0619-MS3)** Source: 17J0394-01 Prepared: 20-Oct-2017 Analyzed: 24-Oct-2017 10:20

|          |      |       |      |      |      |     |        |  |  |   |
|----------|------|-------|------|------|------|-----|--------|--|--|---|
| Fluoride | 3.27 | 0.200 | mg/L | 2.00 | 1.13 | 107 | 75-125 |  |  | D |
|----------|------|-------|------|------|------|-----|--------|--|--|---|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFJ0619-MS4)** Source: 17J0394-01RE2 Prepared: 20-Oct-2017 Analyzed: 24-Oct-2017 14:02

|          |      |     |      |      |      |      |        |  |  |   |
|----------|------|-----|------|------|------|------|--------|--|--|---|
| Chloride | 2070 | 100 | mg/L | 1000 | 1170 | 90.2 | 75-125 |  |  | D |
|----------|------|-----|------|------|------|------|--------|--|--|---|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.





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**Reported:**  
15-Nov-2017 18:02

**Wet Chemistry - Quality Control**

**Batch BFJ0655 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: gm

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0655-BLK1)</b>         |        |                 |       |             | Prepared: 23-Oct-2017 Analyzed: 04-Nov-2017 22:26 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0655-BS1)</b>            |        |                 |       |             | Prepared: 23-Oct-2017 Analyzed: 04-Nov-2017 22:45 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 20.6   | 0.50            | mg/L  | 20.0        |   | 103  | 90-110      |     |           |       |



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**Reported:**  
15-Nov-2017 18:02

**Wet Chemistry - Quality Control**

**Batch BFJ0684 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0684-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 24-Oct-2017 Analyzed: 24-Oct-2017 08:46 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0684-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 24-Oct-2017 Analyzed: 24-Oct-2017 08:46 |      |             |      |           |       |
| Dissolved Solids                | 493    | 5.0                       | mg/L  | 500         |   | 98.6 | 90-110      |      |           |       |
| <b>Duplicate (BFJ0684-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17J0394-01</b> |       |             | Prepared: 24-Oct-2017 Analyzed: 24-Oct-2017 08:46 |      |             |      |           |       |
| Dissolved Solids                | 2710   | 50.0                      | mg/L  |             | 2770  |      |             | 2.37 | 20        |       |



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Reported:  
15-Nov-2017 18:02

### Wet Chemistry - Quality Control

#### Batch BFJ0734 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD | RPD Limit | Notes |
|---------------------------------|--------|---|------------|-------------|---------------|------|--------------|-----|-----------|-------|
| <b>Blank (BFJ0734-BLK1)</b>     |        | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:20 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| <b>Blank (BFJ0734-BLK2)</b>     |        | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 17:15 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| <b>Reference (BFJ0734-SRM1)</b> |        | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:20 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | 101    | 1.00  | mg/L CaCO3 | 108         |               | 93.9 | 90.37-108.33 |     |           |       |



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**Reported:**  
15-Nov-2017 18:02

**Wet Chemistry - Quality Control**

**Batch BFK0049 - No Prep Wet Chem**

Instrument: LCHAT1 Analyst: RLM

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0049-BLK1)</b> |        |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:31 |      |             |     |           |       |
| Sulfate                     | ND     | 2.00            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0049-BS1)</b>    |        |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:39 |      |             |     |           |       |
| Sulfate                     | 14.8   | 2.00            | mg/L  | 15.0        |   | 98.6 | 90-110      |     |           |       |



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Reported:  
15-Nov-2017 18:02

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 375.2 in Water</b>         |                                 |
| Sulfate                           | WADOE,NELAP                     |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |



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**EPA 8260C in Water**

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Chloromethane                         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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|                             |                                 |
|-----------------------------|---------------------------------|
| 1,3-Dichloropropane         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene           | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

Alkalinity, Bicarbonate NELAP,WADOE,WA-DW,DoD-ELAP



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

|                       |                            |
|-----------------------|----------------------------|
| Alkalinity, Carbonate | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total     | DoD-ELAP,WADOE,WA-DW,NELAP |

**SM 5310 B-00 in Water**

|                          |                   |
|--------------------------|-------------------|
| Dissolved Organic Carbon | WADOE,WA-DW,NELAP |
|--------------------------|-------------------|

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Nov-2017 18:02

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



16 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0430

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **1720430**  
 Turn-around Requested: **Normal**  
 ARI Client Company: **Pioneer Technologies**  
 Phone: **360-570-1700**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **DG Cooper 206-660-3466**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: **10-23-17**  
 Page: **1** of **2**  
 No. of Coolers: **1**  
 Cooler Temps: **2**

| Sample ID   | Date     | Time  | Matrix | No. Containers | Analysis Requested  |  |  |   |  |  |                                   |                         | Notes/Comments                          |  |
|---|----------|-------|--------|----------------|---|--|--|---|--|--|-----------------------------------|-------------------------|---|--|
|   |          |       |        |                | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A  | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320   | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B |   |  |
| GW-7F2-1-102317   | 10-23-17 | 9:25  | water  | 4              | X   | X  | X  | X   | X  | X  | X                                 | X                       | Disolved Samples Field Filtered 0.45 um |  |
| GW-7F2-1-102317-(20)  |          | 9:25  |        | 4              | X   | X  | X  | X   | X  | X  | X                                 | X                       |   |  |
| GW-7F3-1-102317   |          | 9:30  |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       |   |  |
| GW-7F3-1-102317-(20)  |          | 9:30  |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       |   |  |
| GW-7F1-2-102317   |          | 10:45 |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       |   |  |
| GW-7F1-2-102317-(20)  |          | 10:45 |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       |   |  |
| GW-7F4-1-102317   |          | 11:45 |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       |   |  |
| GW-7F4-1-102317-(20)  |          | 11:45 |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       |   |  |
| GW-7E9-2-102317   |          | 12:00 |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       | MS/MSD                                  |  |
| GW-7E9-2-102317-(20)  |          | 12:00 |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       | MS/MSD                                  |  |
| LE10-1-102317   |          | 13:00 |        |                | X   | X  | X  | X   | X  | X  | X                                 | X                       |   |  |
| Comments/Special Instructions   |          |       |        |                |   |  |  |   |  |  |                                   |                         |   |  |
| submit EDD to PIONEER using PIONEER EDD format ill to Port of Tacoma                          |          |       |        |                |   |  |  |   |  |  |                                   |                         |   |  |
| O#79227   |          |       |        |                |   |  |  |   |  |  |                                   |                         |   |  |
| Relinquished by: <i>[Signature]</i><br>Printed Name: <b>Zelus Hark</b><br>Company: <b>ARI</b> |          |       |        |                | Relinquished by: <i>[Signature]</i><br>Printed Name: <b>Stephanie Fisher</b><br>Company: <b>ARI</b> |  |  |   |  | Received by: <i>[Signature]</i><br>Printed Name: <b>[Signature]</b><br>Company: <b>[Signature]</b> |                                   |                         |   |  |
| Date & Time: <b>10/23/17</b>  |          |       |        |                | Date & Time: <b>10/23/17</b>  |  |  |   |  | Date & Time: <b>10/23/17 1540</b>  |                                   |                         |   |  |

**imits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by a client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**ample Retention Policy:** Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-8200 206-695-8201 (fax)



Date: **10/23/17**  
 Page: **2** of **2**  
 No. of Coolers: **2**  
 Cooler Temps:

Turn-around Requested: **Normal**  
 Phone: **360-570-1700**  
 Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FSDG Inv**  
 Client Project #: **79227**

| Sample ID                     | Date   | Time | Matrix | No. Containers | Analysis Requested                             |  |                                    |   |   |  |                                   | Notes/Comments |   |
|-------------------------------|--|------|--------|----------------|--|--|------------------------------------|---|---|--|-----------------------------------|----------------|---|
|                               |  |      |        |                | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A       | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C | Dissolved Sulfate, Orthophosphorus, Bromide, Chloride, Fluoride, Nitrate, EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 |                | Dissolved DOC SM 5310 B                     |
| GW-7E1D-1-102317-(20)         | 10-23-17                                       | 1300 | Water  | 4              | X  | X  | X                                  | X   | X   | X  | X                                 | X              | All dissolved samples field filtered 0.45uM |
| GW-7E4-2-102317*              | 1315   | 1315 |        |                | X  | X  | X                                  | X   | X   | X  | X                                 | X              |   |
| GW-7E4-2-102317-(20)          | 1315   | 1315 |        |                | X  | X  | X                                  | X   | X   | X  | X                                 | X              |   |
| GW-6E12-2-102317              | 1400   | 1400 |        |                | X  | X  | X                                  | X   | X   | X  | X                                 | X              |   |
| GW-6E12-2-102317-(20)         | 1405   | 1405 |        |                | X  | X  | X                                  | X   | X   | X  | X                                 | X              |   |
| EB-102317                     | 1405   | 1405 |        |                | X  | X  | X                                  | X   | X   | X  | X                                 | X              |   |
| EB-102317-(20)                | 1405   | 1405 |        |                | X  | X  | X                                  | X   | X   | X  | X                                 | X              |   |
| Comments/Special Instructions | Relinquished by (Signature) <i>[Signature]</i> |      |        |                | Relinquished by (Signature) <i>[Signature]</i> |  |                                    |   | Received by (Signature) <i>[Signature]</i>  |  |                                   |                |   |
| Submit EDD to PIONEER         | Project Name: <i>Lucasbrook</i>                |      |        |                | Project Name: <i>Stephanie Fisher</i>          |  |                                    |   | Printed Name: <i>[Name]</i>   |  |                                   |                |   |
| sing PIONEER EDD format       | Company: <i>BOF</i>                            |      |        |                | Company: <i>ARI</i>                            |  |                                    |   | Company: <i>[Company]</i>   |  |                                   |                |   |
| ill to Port of Tacoma         | Date & Time: <i>10/23/17 1540</i>              |      |        |                | Date & Time: <i>10/23/17 1540</i>              |  |                                    |   | Date & Time: <i>[Date &amp; Time]</i>   |  |                                   |                |   |
| C#79227                       | Date & Time: <i>10/23/17 1540</i>              |      |        |                | Date & Time: <i>10/23/17 1540</i>              |  |                                    |   | Date & Time: <i>[Date &amp; Time]</i>   |  |                                   |                |   |

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WORK ORDER

17J0430

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                    | pH |        |
|--------------|-----------------------------------|----|--------|
| 17J0430-01 A | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-01 B | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-01 C | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-01 D | HDPE NM, 500 mL, 1:1 HNO3         | <2 | pass   |
| 17J0430-02 A | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | pass   |
| 17J0430-02 B | Small OJ, 500 mL                  |    |        |
| 17J0430-02 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | pass   |
| 17J0430-02 D | Large OJ, 1000 mL                 |    |        |
| 17J0430-03 A | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-03 B | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-03 C | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-03 D | HDPE NM, 500 mL, 1:1 HNO3         | >2 | fail * |
| 17J0430-04 A | Glass NM, Amber, 250 mL, 9N H2SO4 | >2 | fail * |
| 17J0430-04 B | Small OJ, 500 mL                  |    |        |
| 17J0430-04 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2 | fail * |
| 17J0430-04 D | Large OJ, 1000 mL                 |    |        |
| 17J0430-05 A | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-05 B | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-05 C | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-05 D | HDPE NM, 500 mL, 1:1 HNO3         | >2 | fail   |
| 17J0430-06 A | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | pass   |
| 17J0430-06 B | Small OJ, 500 mL                  |    |        |
| 17J0430-06 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2 | fail   |
| 17J0430-06 D | Large OJ, 1000 mL                 |    |        |
| 17J0430-07 A | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-07 B | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-07 C | VOA Vial, Clear, 40 mL, HCL       |    |        |
| 17J0430-07 D | HDPE NM, 500 mL, 1:1 HNO3         | >2 | fail * |
| 17J0430-08 A | Glass NM, Amber, 250 mL, 9N H2SO4 | >2 | fail   |
| 17J0430-08 B | Small OJ, 500 mL                  |    |        |
| 17J0430-08 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2 | fail * |

\* = sample had dark color  
looked like sample  
failed

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_



WORK ORDER

17J0430

| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |      |
|--|-----------------------------------|--|------|
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |      |
| 17J0430-08 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-09 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-09 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-09 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-09 D   | HDPE NM, 500 mL, 1:1 HNO3         | L2   | pass |
| 17J0430-10 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | L2   | pass |
| 17J0430-10 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-10 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2   | pass |
| 17J0430-10 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-11 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-11 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-11 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-11 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2   | fail |
| 17J0430-12 A   | Glass NM, Amber, 250 mL, 9N H2SO4 |  |      |
| 17J0430-12 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-12 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2   | fail |
| 17J0430-12 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-13 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-13 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-13 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-13 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2   | fail |
| 17J0430-14 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | L2   | pass |
| 17J0430-14 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-14 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2   | fail |
| 17J0430-14 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-15 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-15 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-15 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-15 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2   | fail |
| 17J0430-16 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | L2   | pass |
| 17J0430-16 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-16 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2   | fail |
| 17J0430-16 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-17 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |





WORK ORDER

17J0430

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |

|              |                                   |    |      |
|--------------|-----------------------------------|----|------|
| 17J0430-17 B | VOA Vial, Clear, 40 mL, HCL       |    |      |
| 17J0430-17 C | VOA Vial, Clear, 40 mL, HCL       |    |      |
| 17J0430-17 D | HDPE NM, 500 mL, 1:1 HNO3         | <2 | pass |
| 17J0430-18 A | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 | pass |
| 17J0430-18 B | Small OJ, 500 mL                  |    |      |
| 17J0430-18 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 | pass |
| 17J0430-18 D | Large OJ, 1000 mL                 |    |      |
| 17J0430-19 A | VOA Vial, Clear, 40 mL, HCL       |    |      |
| 17J0430-19 B | VOA Vial, Clear, 40 mL, HCL       |    |      |

13F  
Preservation Confirmed By

10/24/17  
Date



# Cooler Receipt Form

ARI Client: Pioneer

Project Name: Arkema FS DG Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17J0430

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? YES  NO

Were custody papers properly filled out (ink, signed, etc.) YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 7.5 8.6

Time: 1540

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: SF

Date: 10/23/17 Time: 1540

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? NA YES  NO

Were all bottles sealed in individual plastic bags? YES  NO

Did all bottles arrive in good condition (unbroken)? YES  NO

Were all bottle labels complete and legible? YES  NO  BF

Did the number of containers listed on COC match with the number of containers received? YES  NO  BF 10/24/17

Did all bottle labels and tags agree with custody papers? YES  NO

Were all bottles used correct for the requested analyses? YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO

Were all VOC vials free of air bubbles? NA YES  NO

Was sufficient amount of sample sent in each bottle? YES  NO

Date VOC Trip Blank was made at ARI: NA

Was Sample Split by ARI : NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: BF Date: 10/24/17 Time: 915

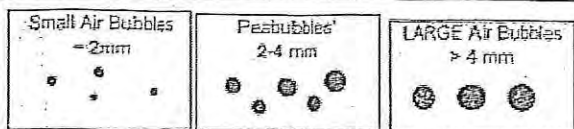
**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

TBs went on CoC  
TBs missing labels

By: \_\_\_\_\_ Date: \_\_\_\_\_



Small → "sm" (< 2 mm)  
Peabubbles → "pb" (2 to < 4 mm)  
Large → "lg" (4 to < 6 mm)  
Headspace → "hs" (> 6 mm)



Pioneer

Air bubbles

GW-7B-1-102317 - 2 vials w/ a lg ~~+ 1 vial w/~~<sup>BF</sup>  
-7E4-1- - 2 vials w/ a sm  
7E10-1 - 3 vials w/ a pb  
7E4-2 - 2 vials w/ a lg, 1 with w/ a sm  
6E12-2 - 2 vials w/ a lg  
EB-102317 - 1 vial w/ a lg





# Cooler Temperature Compliance Form

Cooler#: 1 Temperature(°C): 7.5

| Sample ID                 | Bottle Count | Bottle Type |
|---------------------------|--------------|-------------|
| Samples received above 6° |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |

Cooler#: 2 Temperature(°C): 8.6

| Sample ID                 | Bottle Count | Bottle Type |
|---------------------------|--------------|-------------|
| Samples received above 6° |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
|                           |              |             |
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Cooler#: \_\_\_\_\_ Temperature(°C): \_\_\_\_\_

| Sample ID | Bottle Count | Bottle Type |
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Cooler#: \_\_\_\_\_ Temperature(°C): \_\_\_\_\_

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
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Completed by: ST Date: 10/23/17 Time: 1540



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID             | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-----------------------|---------------|--------|-------------------|-------------------|
| GW-7F2-1-102317       | 17J0430-01    | Water  | 23-Oct-2017 09:25 | 23-Oct-2017 15:40 |
| GW-7F2-1-102317-(20)  | 17J0430-02    | Water  | 23-Oct-2017 09:25 | 23-Oct-2017 15:40 |
| GW-7F3-1-102317       | 17J0430-03    | Water  | 23-Oct-2017 09:30 | 23-Oct-2017 15:40 |
| GW-7F3-1-102317-(20)  | 17J0430-04    | Water  | 23-Oct-2017 09:30 | 23-Oct-2017 15:40 |
| GW-7F1-2-102317       | 17J0430-05    | Water  | 23-Oct-2017 10:45 | 23-Oct-2017 15:40 |
| GW-7F1-2-102317-(20)  | 17J0430-06    | Water  | 23-Oct-2017 10:45 | 23-Oct-2017 15:40 |
| GW-7F4-1-102317       | 17J0430-07    | Water  | 23-Oct-2017 11:45 | 23-Oct-2017 15:40 |
| GW-7F4-1-102317-(20)  | 17J0430-08    | Water  | 23-Oct-2017 11:45 | 23-Oct-2017 15:40 |
| GW-7E9-2-102317       | 17J0430-09    | Water  | 23-Oct-2017 12:00 | 23-Oct-2017 15:40 |
| GW-7E9-2-102317-(20)  | 17J0430-10    | Water  | 23-Oct-2017 12:00 | 23-Oct-2017 15:40 |
| GW-7E10-1-102317      | 17J0430-11    | Water  | 23-Oct-2017 13:00 | 23-Oct-2017 15:40 |
| GW-7E10-1-102317-(20) | 17J0430-12    | Water  | 23-Oct-2017 13:00 | 23-Oct-2017 15:40 |
| GW-7E4-2-102317       | 17J0430-13    | Water  | 23-Oct-2017 13:15 | 23-Oct-2017 15:40 |
| GW-7E4-2-102317-(20)  | 17J0430-14    | Water  | 23-Oct-2017 13:15 | 23-Oct-2017 15:40 |
| GW-6E12-2-102317      | 17J0430-15    | Water  | 23-Oct-2017 14:00 | 23-Oct-2017 15:40 |
| GW-6E12-2-102317-(20) | 17J0430-16    | Water  | 23-Oct-2017 14:00 | 23-Oct-2017 15:40 |
| EB-102317             | 17J0430-17    | Water  | 23-Oct-2017 14:05 | 23-Oct-2017 15:40 |
| EB-102317-(20)        | 17J0430-18    | Water  | 23-Oct-2017 14:05 | 23-Oct-2017 15:40 |
| Trip Blanks           | 17J0430-19    | Water  | 23-Oct-2017 00:00 | 23-Oct-2017 15:40 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 23, 2017 under ARI workorder 17J0430. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Samples GW-7E9-2-102317 and GW-7E10-1-102317 were reanalyzed at higher reporting limits due to various compounds exceeding the upper calibration ranges. These compounds have been flagged with an "E" qualifier on the initial runs. No further corrective action was taken.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

Method blank BFJ0771 has Tetrachloroethene detected below the reporting limit, but above the method detection limit. This analyte has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E9-2-102317. The matrix spike percent recovery and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E9-2-102317-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.



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Reported:  
16-Nov-2017 15:08

Initial and continuing calibrations were within method requirements.

Method blank BFJ0825 has Arsenic detected below the reporting limit, but above the method detection limit. The Arsenic has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E9-2-102317. The matrix spike percent recoveries were within QC limits. The duplicate has a Nickel concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. The Nickel has been flagged with an "L" qualifier on the duplicate. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E9-2-102317-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFJ0385 has Sodium and Iron detected below the reporting limits, but above the method detection limits. The Sodium and Iron have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-7F2-1-102317-(20). The matrix spike and duplicate have a Sodium concentration that exceeds the upper calibration limit. The Sodium has been flagged with an "E" qualifier. The duplicate has an Aluminum concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. The Aluminum has been flagged with an "L" qualifier on the duplicate. The matrix spike has a natural concentration of Sodium that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Sodium has been flagged with an "HC" qualifier on the matrix spike. This is likely due to matrix interference. No further corrective action was taken.

#### **Anions - EPA Method 300.0**

The samples were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E9-2-102317-(20). The matrix spike percent



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Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

recovery and duplicate RPD were within QC limits.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

Sample GW-7F3-1-102317-(20) was not analyzed due to pH issues with the matrix.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

A duplicate was prepared in conjunction with sampe GW-7E9-2-102317-(20). The duplicate RPD was within QC limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-7E9-2-102317-(20). The duplicate RPD was within QC limits.

#### **Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E9-2-102317-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.





WORK ORDER

17J0430

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                    | pH  |  |
|--------------|-----------------------------------|-----|--|
| 17J0430-01 A | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-01 B | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-01 C | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-01 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 | pass                                     |
| 17J0430-02 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 | pass                                     |
| 17J0430-02 B | Small OJ, 500 mL                  |     |  |
| 17J0430-02 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 | pass                                     |
| 17J0430-02 D | Large OJ, 1000 mL                 |     |  |
| 17J0430-03 A | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-03 B | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-03 C | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-03 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 | fail *                                   |
| 17J0430-04 A | Glass NM, Amber, 250 mL, 9N H2SO4 | > 2 | fail * // < 2 2ml H2SO4 9N<br>w 10-24-17 |
| 17J0430-04 B | Small OJ, 500 mL                  |     |  |
| 17J0430-04 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2 | fail *                                   |
| 17J0430-04 D | Large OJ, 1000 mL                 |     |  |
| 17J0430-05 A | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-05 B | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-05 C | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-05 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 | fail                                     |
| 17J0430-06 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 | pass                                     |
| 17J0430-06 B | Small OJ, 500 mL                  |     |  |
| 17J0430-06 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2 | fail                                     |
| 17J0430-06 D | Large OJ, 1000 mL                 |     |  |
| 17J0430-07 A | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-07 B | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-07 C | VOA Vial, Clear, 40 mL, HCL       |     |  |
| 17J0430-07 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 | fail *                                   |
| 17J0430-08 A | Glass NM, Amber, 250 mL, 9N H2SO4 | > 2 | fail // 4ml H2SO4 9N<br>w 10-24-17       |
| 17J0430-08 B | Small OJ, 500 mL                  |     |  |
| 17J0430-08 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2 | fail *                                   |

\* = sample had dark color  
looked like sample  
failed

Reviewed By \_\_\_\_\_

Date \_\_\_\_\_



WORK ORDER

17J0430

|  |                                   |  |      |
|--|-----------------------------------|--|------|
| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |      |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |      |
| 17J0430-08 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-09 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-09 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-09 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-09 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2   | pass |
| 17J0430-10 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2   | pass |
| 17J0430-10 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-10 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2   | pass |
| 17J0430-10 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-11 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-11 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-11 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-11 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2   | fail |
| 17J0430-12 A   | Glass NM, Amber, 250 mL, 9N H2SO4 |  |      |
| 17J0430-12 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-12 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2   | fail |
| 17J0430-12 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-13 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-13 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-13 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-13 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2   | fail |
| 17J0430-14 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2   | pass |
| 17J0430-14 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-14 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2   | fail |
| 17J0430-14 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-15 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-15 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-15 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-15 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2   | fail |
| 17J0430-16 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2   | pass |
| 17J0430-16 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-16 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2   | fail |
| 17J0430-16 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-17 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |

Reviewed By \_\_\_\_\_

Date \_\_\_\_\_





WORK ORDER

17J0430

|  |                                   |  |      |
|--|-----------------------------------|--|------|
| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |      |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |      |
| 17J0430-17 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-17 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-17 D   | HDPE NM, 500 mL, 1:1 HNO3         | < 2  | pass |
| 17J0430-18 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2  | pass |
| 17J0430-18 B   | Small OJ, 500 mL                  |  |      |
| 17J0430-18 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2  | pass |
| 17J0430-18 D   | Large OJ, 1000 mL                 |  |      |
| 17J0430-19 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0430-19 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |

13F  
Preservation Confirmed By

10/24/17  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**GW-7F2-1-102317**  
**17J0430-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 09:25  
Analyzed: 25-Oct-2017 13:10

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0731 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.05</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.09</b> | ug/L  | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 93.3  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102   | %     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317**  
**17J0430-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 09:25  
Analyzed: 06-Nov-2017 23:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.355</b> | ug/L  |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317**  
**17J0430-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 09:25  
Analyzed: 06-Nov-2017 23:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>145</b>  | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>58.1</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>23.8</b> | ug/L  |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317**  
**17J0430-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 09:25  
Analyzed: 02-Nov-2017 14:15

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 09:25  
Analyzed: 03-Nov-2017 17:13

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0268</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>48.1</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0788</b> | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>60.7</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0107</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>11.0</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>5.00</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>350</b>    | mg/L  |       |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 09:25  
Analyzed: 07-Nov-2017 00:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.154</b> | ug/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 09:25  
Analyzed: 07-Nov-2017 00:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>154</b>  | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>50.1</b> | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>22.3</b> | ug/L  |       |





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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 09:25  
Analyzed: 02-Nov-2017 15:32

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 09:25  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 50 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1290</b> | mg/L  |       |



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Olympia WA, 98503

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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 09:25  
Analyzed: 24-Oct-2017 17:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.106</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.746</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------|------------|----------|-----------------|-------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>2.02</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.39</b> | mg-P/L |       |



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Olympia WA, 98503

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Reported:  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/23/2017 09:25

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>281</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>281</b> | mg/L CaCO3 |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 09:25  
Analyzed: 09-Nov-2017 18:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>35.9</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 09:25  
Analyzed: 25-Oct-2017 23:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>113</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F2-1-102317-(20)**  
**17J0430-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 09:25  
Analyzed: 26-Oct-2017 03:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>593</b> | mg/L  | D     |



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Reported:  
16-Nov-2017 15:08

**GW-7F3-1-102317**  
**17J0430-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 09:30  
Analyzed: 25-Oct-2017 13:34

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0731 Sample Size: 1 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 97.4 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.9 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 93.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101 %  |       |





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Olympia WA, 98503

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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317**  
**17J0430-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 09:30  
Analyzed: 07-Nov-2017 17:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0074 Sample Size: 2.5 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 13.6            | 20.0            | ND     | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317**  
**17J0430-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 09:30  
Analyzed: 07-Nov-2017 17:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0074 Sample Size: 2.5 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 4.40            | 40.0            | <b>2760</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 68.0            | 100             | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 10.0            | 100             | <b>232</b>  | ug/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317**  
**17J0430-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 09:30  
Analyzed: 02-Nov-2017 14:17

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 10 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000200        | <b>0.000220</b> | mg/L  |       |



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Reported:  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 09:30  
Analyzed: 03-Nov-2017 18:38

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 200      | 1.70            | 10.0            | <b>42.5</b>  | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 200      | 1.02            | 10.0            | <b>2.25</b>  | mg/L  | J, D  |
| Iron, Dissolved      | 7439-89-6  | 200      | 0.260           | 10.0            | <b>6.00</b>  | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 200      | 3.20            | 10.0            | ND           | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 200      | 0.0680          | 0.200           | ND           | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 200      | 10.4            | 100             | <b>176</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 200      | 1.04            | 12.0            | <b>10600</b> | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 200      | 380             | 10000           | <b>17700</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 09:30  
Analyzed: 06-Nov-2017 23:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 09:30  
Analyzed: 06-Nov-2017 23:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2120</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>29.9</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>131</b>  | ug/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 09:30  
Analyzed: 02-Nov-2017 15:34

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 10 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 09:30  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>63600</b> | mg/L  |       |





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Reported:  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 09:30  
Analyzed: 24-Oct-2017 18:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>42.6</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | <b>5.59</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | <b>28.4</b> | mg-P/L | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 09:30  
Analyzed: 09-Nov-2017 19:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 100      | 50.0            | <b>831</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 09:30  
Analyzed: 25-Oct-2017 23:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2040</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F3-1-102317-(20)**  
**17J0430-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 09:30  
Analyzed: 26-Oct-2017 03:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>11800</b> | mg/L  | D     |



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Reported:  
16-Nov-2017 15:08

**GW-7F1-2-102317**  
**17J0430-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 10:45  
Analyzed: 25-Oct-2017 13:54

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0731 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | 22.2     | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 101   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.4  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 94.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317**  
**17J0430-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 10:45  
Analyzed: 06-Nov-2017 23:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317**  
**17J0430-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 10:45  
Analyzed: 06-Nov-2017 23:07

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 10       | 0.220           | 2.00            | <b>31.5</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 10       | 3.40            | 5.00            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>2.73</b> | ug/L  | J, D  |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317**  
**17J0430-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 10:45  
Analyzed: 02-Nov-2017 14:19

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 10:45  
Analyzed: 03-Nov-2017 17:30

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>43.0</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>0.0497</b> | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>114</b>    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>0.0082</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>181</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>24.4</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>7420</b>   | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 10:45  
Analyzed: 07-Nov-2017 00:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 10:45  
Analyzed: 07-Nov-2017 00:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>42.2</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>36.0</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>2.82</b> | ug/L  | J, D  |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 10:45  
Analyzed: 02-Nov-2017 15:36

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 10:45  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>17700</b> | mg/L  |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 10:45  
Analyzed: 24-Oct-2017 18:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>2.16</b> | mg-P/L |       |



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Reported:  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/23/2017 10:45  
Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1770   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1770   | mg/L CaCO3 |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 10:45  
Analyzed: 09-Nov-2017 19:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>49.6</b> | mg/L  | D     |





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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 10:45  
Analyzed: 26-Oct-2017 00:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>8.75</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>4.53</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>12.2</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F1-2-102317-(20)**  
**17J0430-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 10:45  
Analyzed: 26-Oct-2017 04:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>10800</b> | mg/L  | D     |



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Reported:  
16-Nov-2017 15:08

**GW-7F4-1-102317**  
**17J0430-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 11:45  
Analyzed: 25-Oct-2017 14:17

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0731 Sample Size: 1 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | <b>5.15</b> | ug/L   |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | <b>3.94</b> | ug/L   |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 96.6 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 96.2 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102 %  |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317**  
**17J0430-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 11:45  
Analyzed: 06-Nov-2017 22:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 50       | 3.40            | 5.00            | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317**  
**17J0430-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 11:45  
Analyzed: 06-Nov-2017 22:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 50       | 1.10            | 10.0            | <b>400</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 50       | 17.0            | 25.0            | <b>33.7</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 50       | 2.50            | 25.0            | <b>181</b>  | ug/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317**  
**17J0430-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 11:45  
Analyzed: 02-Nov-2017 14:20

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000160</b> | mg/L  |       |



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Reported:  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 11:45  
Analyzed: 03-Nov-2017 18:43

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 20       | 0.170           | 1.00            | ND          | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 20       | 0.102           | 1.00            | <b>1.78</b> | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 20       | 0.0260          | 1.00            | <b>1.99</b> | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 20       | 0.320           | 1.00            | ND          | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 20       | 0.0068          | 0.0200          | ND          | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 20       | 1.04            | 10.0            | <b>107</b>  | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 20       | 0.104           | 1.20            | <b>930</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 20       | 38.0            | 1000            | <b>9830</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 11:45  
Analyzed: 06-Nov-2017 22:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 50       | 3.40            | 5.00            | ND     | ug/L  | U     |





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**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 11:45  
Analyzed: 06-Nov-2017 22:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>256</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 50       | 17.0            | 25.0            | <b>22.8</b> | ug/L  | J, D  |
| Nickel, Dissolved  | 7440-02-0  | 50       | 2.50            | 25.0            | <b>110</b>  | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 11:45  
Analyzed: 02-Nov-2017 15:37

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 10 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000200        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 11:45  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>38400</b> | mg/L  |       |



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Reported:  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 11:45  
Analyzed: 24-Oct-2017 18:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>26.0</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | <b>18.5</b> | mg-P/L | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 11:45  
Analyzed: 09-Nov-2017 19:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 50       | 25.0            | <b>821</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 11:45  
Analyzed: 26-Oct-2017 00:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1010</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7F4-1-102317-(20)**  
**17J0430-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 11:45  
Analyzed: 26-Oct-2017 04:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>11600</b> | mg/L  | D     |



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Reported:  
16-Nov-2017 15:08

**GW-7E9-2-102317**  
**17J0430-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 12:00  
Analyzed: 25-Oct-2017 14:38

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0731 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>83.8</b> | ug/L  | E     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>12.2</b> | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>3.18</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>12.2</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 96.5  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.3  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 99.8  | %     |





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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317**  
**17J0430-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 12:00  
Analyzed: 06-Nov-2017 21:57

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317**  
**17J0430-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 12:00  
Analyzed: 06-Nov-2017 21:57

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>51.7</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>1.08</b> | ug/L  | J, D  |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317**  
**17J0430-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 12:00  
Analyzed: 02-Nov-2017 14:22

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
16-Nov-2017 15:08

**GW-7E9-2-102317**  
**17J0430-09RE1 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 12:00  
Analyzed: 26-Oct-2017 12:10

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 2 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | <b>93.6</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | <b>12.3</b>     | ug/L          |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | <b>3.11</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | <b>11.7</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>102 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>96.2 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>92.0 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>104 %</i>  |       |



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Reported:  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 12:00  
Analyzed: 06-Nov-2017 17:41

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 33.2   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 0.0392 | mg/L  | J     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 91.3   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 0.0512 | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 55.5   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 16.9   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | 1740   | mg/L  |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 12:00  
Analyzed: 06-Nov-2017 18:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 12:00  
Analyzed: 06-Nov-2017 18:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>52.3</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.730</b> | ug/L  | J, D  |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 12:00  
Analyzed: 02-Nov-2017 15:39

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 12:00  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 100             | <b>4100</b> | mg/L  |       |



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Reported:  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 12:00  
Analyzed: 24-Oct-2017 19:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>2.16</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------|------------|----------|-----------------|-------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>1.23</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.54</b> | mg-P/L |       |



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Reported:  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/23/2017 12:00

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 478    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 478    | mg/L CaCO3 |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 12:00  
Analyzed: 09-Nov-2017 20:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>15.4</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 12:00  
Analyzed: 26-Oct-2017 00:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>11.0</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**GW-7E9-2-102317-(20)**  
**17J0430-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 12:00  
Analyzed: 26-Oct-2017 22:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>2420</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**GW-7E10-1-102317**  
**17J0430-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 13:00  
Analyzed: 25-Oct-2017 15:01

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0731 Sample Size: 2 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | <b>419</b>  | ug/L   | E     |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | <b>3210</b> | ug/L   | E     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | <b>696</b>  | ug/L   | E     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | <b>1930</b> | ug/L   | E     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 98.6 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.6 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 92.5 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 100 %  |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317**  
**17J0430-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 13:00  
Analyzed: 06-Nov-2017 23:17

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |





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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317**  
**17J0430-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 13:00  
Analyzed: 07-Nov-2017 17:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 10       | 0.220           | 2.00            | <b>1650</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>55.3</b> | ug/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317**  
**17J0430-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 13:00  
Analyzed: 02-Nov-2017 14:27

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000430</b> | mg/L  |       |



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Reported:  
16-Nov-2017 15:08

**GW-7E10-1-102317**  
**17J0430-11RE1 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 13:00  
Analyzed: 26-Oct-2017 12:56

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 0.2 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units  | Notes |
|--|------------|----------|-----------------|-----------------|--------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 2.86            | 10.0            | <b>359</b>   | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 1.37            | 10.0            | <b>13400</b> | ug/L   | E     |
| Trichloroethene                          | 79-01-6    | 1        | 2.45            | 10.0            | <b>714</b>   | ug/L   |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 2.37            | 10.0            | <b>4680</b>  | ug/L   | E     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %     | 98.3 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %     | 93.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %     | 91.1 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %     | 106 %  |       |



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Reported:  
16-Nov-2017 15:08

**GW-7E10-1-102317**  
**17J0430-11RE2 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 13:00  
Analyzed: 26-Oct-2017 17:03

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 0.02 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 28.6            | 100             | <b>485</b>   | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 13.7            | 100             | <b>36900</b> | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 24.5            | 100             | <b>886</b>   | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 23.7            | 100             | <b>5190</b>  | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %     | 105   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %     | 94.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %     | 88.2  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %     | 105   | %     |



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Reported:  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 13:00  
Analyzed: 03-Nov-2017 17:39

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>2.88</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>0.737</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>0.293</b>  | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0075</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>51.6</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>64.5</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>3870</b>   | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 13:00  
Analyzed: 07-Nov-2017 00:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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Reported:  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 13:00  
Analyzed: 07-Nov-2017 17:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2680</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>2.50</b> | ug/L  | J, D  |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>56.9</b> | ug/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 13:00  
Analyzed: 02-Nov-2017 15:47

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000120</b> | mg/L  |       |





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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 13:00  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>7600</b> | mg/L  |       |



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Reported:  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 13:00  
Analyzed: 24-Oct-2017 20:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Reported:  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/23/2017 13:00  
Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 427    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 1250   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1680   | mg/L CaCO3 |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 13:00  
Analyzed: 09-Nov-2017 21:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 13:00  
Analyzed: 25-Oct-2017 10:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 2        | 0.200           | <b>1.79</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>1.89</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 0.20            | <b>4.52</b> | mg-P/L | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 13:00  
Analyzed: 26-Oct-2017 02:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>180</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E10-1-102317-(20)**  
**17J0430-12RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 13:00  
Analyzed: 26-Oct-2017 23:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>4000</b> | mg/L  | D     |



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Reported:  
16-Nov-2017 15:08

**GW-7E4-2-102317**  
**17J0430-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 13:15  
Analyzed: 26-Oct-2017 12:33

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 1 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | <b>596</b>  | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | <b>132</b>  | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | <b>20.3</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | <b>14.7</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 98.3  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 92.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102   | %     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317**  
**17J0430-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 13:15  
Analyzed: 06-Nov-2017 23:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317**  
**17J0430-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 13:15  
Analyzed: 06-Nov-2017 23:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>330</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>2.98</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>14.9</b> | ug/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317**  
**17J0430-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 13:15  
Analyzed: 02-Nov-2017 14:28

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 13:15  
Analyzed: 03-Nov-2017 17:35

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0453</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>24.2</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>0.158</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>42.7</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0822</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>58.4</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>24.7</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>3580</b>   | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 13:15  
Analyzed: 07-Nov-2017 00:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 13:15  
Analyzed: 07-Nov-2017 00:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>303</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>2.54</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>12.3</b> | ug/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 13:15  
Analyzed: 02-Nov-2017 15:49

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 13:15  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>7580</b> | mg/L  |       |





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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 13:15  
Analyzed: 24-Oct-2017 21:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/23/2017 13:15  
Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1030</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>675</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1700</b> | mg/L CaCO3 |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 13:15  
Analyzed: 09-Nov-2017 22:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>4.02</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 13:15  
Analyzed: 25-Oct-2017 10:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>5.88</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.605</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>5.34</b> | mg-P/L | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 13:15  
Analyzed: 26-Oct-2017 02:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | 17.3   | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-7E4-2-102317-(20)**  
**17J0430-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 13:15  
Analyzed: 26-Oct-2017 23:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>4290</b> | mg/L  | D     |



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Reported:  
16-Nov-2017 15:08

**GW-6E12-2-102317**  
**17J0430-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 14:00  
Analyzed: 26-Oct-2017 11:47

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 10 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 107   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 93.0  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 109   | %     |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317**  
**17J0430-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 14:00  
Analyzed: 06-Nov-2017 23:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |





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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317**  
**17J0430-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 14:00  
Analyzed: 07-Nov-2017 14:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 50       | 1.10            | 10.0            | <b>10800</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>3.36</b>  | ug/L  | J, D  |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317**  
**17J0430-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 14:00  
Analyzed: 02-Nov-2017 14:34

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 14:00  
Analyzed: 06-Nov-2017 17:26

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>286</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>0.413</b> | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>898</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>0.367</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>357</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>40.3</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>10600</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 14:00  
Analyzed: 06-Nov-2017 23:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 14:00  
Analyzed: 07-Nov-2017 17:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>9250</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>3.14</b> | ug/L  | J, D  |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 14:00  
Analyzed: 02-Nov-2017 15:51

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 14:00  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26700</b> | mg/L  |       |



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Reported:  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 14:00  
Analyzed: 24-Oct-2017 21:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.48</b> | mg-P/L |       |





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Reported:  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/23/2017 14:00  
Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 2460   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 2460   | mg/L CaCO3 |       |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 14:00  
Analyzed: 09-Nov-2017 22:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 14:00  
Analyzed: 26-Oct-2017 03:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>18.8</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 1.00            | <b>2.82</b> | mg-P/L | H, D  |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 14:00  
Analyzed: 27-Oct-2017 00:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>17800</b> | mg/L  | D     |



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**Reported:**  
16-Nov-2017 15:08

**GW-6E12-2-102317-(20)**  
**17J0430-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 14:00  
Analyzed: 27-Oct-2017 00:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705 Sample Size: 5 mL  
Prepared: 24-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | 37.1   | mg/L  | D     |



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Reported:  
16-Nov-2017 15:08

**EB-102317**  
**17J0430-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 14:05  
Analyzed: 26-Oct-2017 11:26

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 10 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.05</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 97.1 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.0 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.6 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106 %  |       |



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**Reported:**  
16-Nov-2017 15:08

**EB-102317**  
**17J0430-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 14:05  
Analyzed: 06-Nov-2017 23:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
16-Nov-2017 15:08

**EB-102317**  
**17J0430-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 14:05  
Analyzed: 06-Nov-2017 23:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFJ0825 Sample Size: 25 mL  
Prepared: 30-Oct-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.0300</b> | ug/L  | J     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND            | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | ND            | ug/L  | U     |





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**Reported:**  
16-Nov-2017 15:08

**EB-102317**  
**17J0430-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 14:05  
Analyzed: 02-Nov-2017 14:36

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
16-Nov-2017 15:08

**EB-102317-(20)**  
**17J0430-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/23/2017 14:05  
Analyzed: 03-Nov-2017 19:00

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>0.0068</b> | mg/L  | J     |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0119</b> | mg/L  | J     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | ND            | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | ND            | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | ND            | mg/L  | U     |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | ND            | mg/L  | U     |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | <b>0.315</b>  | mg/L  | J     |



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**Reported:**  
16-Nov-2017 15:08

**EB-102317-(20)**  
**17J0430-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/23/2017 14:05  
Analyzed: 07-Nov-2017 00:18

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**EB-102317-(20)**  
**17J0430-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/23/2017 14:05  
Analyzed: 07-Nov-2017 00:18

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0037 Sample Size: 25 mL  
Prepared: 02-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.188</b> | ug/L  | J     |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | ND           | ug/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**EB-102317-(20)**  
**17J0430-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/23/2017 14:05  
Analyzed: 02-Nov-2017 15:52

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0039 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**EB-102317-(20)**  
**17J0430-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/23/2017 14:05  
Analyzed: 25-Oct-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0728 Sample Size: 200 mL  
Prepared: 25-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Solids |            | 1        | 5.0             | ND     | mg/L  | U     |



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**Reported:**  
16-Nov-2017 15:08

**EB-102317-(20)**  
**17J0430-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/23/2017 14:05  
Analyzed: 24-Oct-2017 21:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0705  
Prepared: 24-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 1        | 0.100           | <b>0.224</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



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Reported:  
16-Nov-2017 15:08

**EB-102317-(20)**  
**17J0430-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/23/2017 14:05  
Analyzed: 25-Oct-2017 17:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |





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**Reported:**  
16-Nov-2017 15:08

**EB-102317-(20)**  
**17J0430-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/23/2017 14:05  
Analyzed: 11-Nov-2017 14:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | ND     | mg/L  | U     |



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Reported:  
16-Nov-2017 15:08

**Trip Blanks**  
**17J0430-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 00:00  
Analyzed: 26-Oct-2017 09:59

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0771 Sample Size: 10 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.07</b> | ug/L   | J     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>10.1</b> | ug/L   |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.13</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.45</b> | ug/L   |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 95.8 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 93.5 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106 %  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0731 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: LH

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0731-BLK2)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 09:35 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.42            |                 | ug/L  | 5.00        |   | 88.4 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.78            |                 | ug/L  | 5.00        |   | 95.7 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.77            |                 | ug/L  | 5.00        |   | 95.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.12            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFJ0731-BS2)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 08:14 |      |             |      |           |       |
| Vinyl Chloride                           | 9.76   |                 |                 | ug/L  | 10.0        |   | 97.6 | 66-133      |      |           |       |
| Chloroform                               | 9.39   |                 |                 | ug/L  | 10.0        |   | 93.9 | 80-122      |      |           |       |
| Trichloroethene                          | 9.70   |                 |                 | ug/L  | 10.0        |   | 97.0 | 80-120      |      |           |       |
| Tetrachloroethene                        | 9.55   |                 |                 | ug/L  | 10.0        |   | 95.5 | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.76            |                 | ug/L  | 5.00        |   | 95.2 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.20            |                 | ug/L  | 5.00        |   | 84.0 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.94            |                 | ug/L  | 5.00        |   | 98.8 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.88            |                 | ug/L  | 5.00        |   | 97.6 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.04            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0731-BSD2)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 08:54 |      |             |      |           |       |
| Vinyl Chloride                           | 9.79   |                 |                 | ug/L  | 10.0        |   | 97.9 | 66-133      | 0.30 | 30        |       |
| Chloroform                               | 9.34   |                 |                 | ug/L  | 10.0        |   | 93.4 | 80-122      | 0.49 | 30        |       |
| Trichloroethene                          | 9.98   |                 |                 | ug/L  | 10.0        |   | 99.8 | 80-120      | 2.88 | 30        |       |
| Tetrachloroethene                        | 9.92   |                 |                 | ug/L  | 10.0        |   | 99.2 | 80-120      | 3.77 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.69            |                 | ug/L  | 5.00        |   | 93.9 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.16            |                 | ug/L  | 5.00        |   | 83.2 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.98            |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0771 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PAB

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0771-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 09:39 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | 0.05   | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.66            |                 | ug/L  | 5.00        |   | 93.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.78            |                 | ug/L  | 5.00        |   | 95.6 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.61            |                 | ug/L  | 5.00        |   | 92.3 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.20            |                 | ug/L  | 5.00        |   | 104  | 80-120      |      |           |       |
| <b>LCS (BFJ0771-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 07:58 |      |             |      |           |       |
| Vinyl Chloride                           | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      |      |           |       |
| Chloroform                               | 9.93   | 0.03            | 0.20            | ug/L  | 10.0        |   | 99.3 | 80-122      |      |           |       |
| Trichloroethene                          | 10.0   | 0.05            | 0.20            | ug/L  | 10.0        |   | 100  | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.82            |                 | ug/L  | 5.00        |   | 96.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.43            |                 | ug/L  | 5.00        |   | 88.7 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.97            |                 | ug/L  | 5.00        |   | 99.4 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.12            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.05            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0771-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 08:38 |      |             |      |           |       |
| Vinyl Chloride                           | 10.3   | 0.06            | 0.20            | ug/L  | 10.0        |   | 103  | 66-133      | 1.99 | 30        |       |
| Chloroform                               | 9.94   | 0.03            | 0.20            | ug/L  | 10.0        |   | 99.4 | 80-122      | 0.11 | 30        |       |
| Trichloroethene                          | 9.85   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.5 | 80-120      | 1.64 | 30        |       |
| Tetrachloroethene                        | 9.89   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.9 | 80-120      | 3.34 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.92            |                 | ug/L  | 5.00        |   | 98.3 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.49            |                 | ug/L  | 5.00        |   | 89.7 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.10            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0825 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result | Detection Limit    | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes   |
|-----------------------------------|---------|--------|--------------------|-----------------|-------|---|---------------|------|-------------|-------|-----------|---------|
| <b>Blank (BFJ0825-BLK1)</b>       |         |        |                    |                 |       |   |               |      |             |       |           |         |
|                                   |         |        |                    |                 |       | Prepared: 30-Oct-2017 Analyzed: 06-Nov-2017 21:48 |               |      |             |       |           |         |
| Lead                              | 208     | ND     | 0.0680             | 0.100           | ug/L  |   |               |      |             |       |           | U       |
| Arsenic                           | 75a     | 0.0260 | 0.0220             | 0.200           | ug/L  |   |               |      |             |       |           | J       |
| Copper                            | 63      | ND     | 0.340              | 0.500           | ug/L  |   |               |      |             |       |           | U       |
| Copper                            | 65      | ND     | 0.350              | 0.500           | ug/L  |   |               |      |             |       |           | U       |
| Nickel                            | 60      | ND     | 0.0500             | 0.500           | ug/L  |   |               |      |             |       |           | U       |
| Nickel                            | 62      | ND     | 0.220              | 0.500           | ug/L  |   |               |      |             |       |           | U       |
| <b>LCS (BFJ0825-BS1)</b>          |         |        |                    |                 |       |   |               |      |             |       |           |         |
|                                   |         |        |                    |                 |       | Prepared: 30-Oct-2017 Analyzed: 06-Nov-2017 22:08 |               |      |             |       |           |         |
| Lead                              | 208     | 25.6   | 0.0680             | 0.100           | ug/L  | 25.0  |               | 103  | 80-120      |       |           |         |
| Arsenic                           | 75a     | 25.0   | 0.0220             | 0.200           | ug/L  | 25.0  |               | 100  | 80-120      |       |           |         |
| Copper                            | 63      | 26.8   | 0.340              | 0.500           | ug/L  | 25.0  |               | 107  | 80-120      |       |           |         |
| Copper                            | 65      | 26.3   | 0.350              | 0.500           | ug/L  | 25.0  |               | 105  | 80-120      |       |           |         |
| Nickel                            | 60      | 25.4   | 0.0500             | 0.500           | ug/L  | 25.0  |               | 102  | 80-120      |       |           |         |
| Nickel                            | 62      | 26.2   | 0.220              | 0.500           | ug/L  | 25.0  |               | 105  | 80-120      |       |           |         |
| <b>Duplicate (BFJ0825-DUP1)</b>   |         |        |                    |                 |       |   |               |      |             |       |           |         |
|                                   |         |        | Source: 17J0430-09 |                 |       | Prepared: 30-Oct-2017 Analyzed: 06-Nov-2017 21:52 |               |      |             |       |           |         |
| Lead                              | 208     | ND     | 0.340              | 0.500           | ug/L  |   | ND            |      |             |       |           | U       |
| Arsenic                           | 75a     | 51.8   | 0.110              | 1.00            | ug/L  |   | 51.7          |      |             | 0.21  | 20        | D       |
| Copper                            | 63      | ND     | 1.70               | 2.50            | ug/L  |   | ND            |      |             |       |           | U       |
| Nickel                            | 60      | 0.790  | 0.250              | 2.50            | ug/L  |   | 1.08          |      |             | 31.00 | 20        | L, J, D |
| <b>Matrix Spike (BFJ0825-MS1)</b> |         |        |                    |                 |       |   |               |      |             |       |           |         |
|                                   |         |        | Source: 17J0430-09 |                 |       | Prepared: 30-Oct-2017 Analyzed: 06-Nov-2017 22:02 |               |      |             |       |           |         |
| Lead                              | 208     | 23.1   | 0.340              | 0.500           | ug/L  | 25.0  | ND            | 92.6 | 75-125      |       |           | D       |
| Arsenic                           | 75a     | 77.2   | 0.110              | 1.00            | ug/L  | 25.0  | 51.7          | 102  | 75-125      |       |           | D       |
| Copper                            | 63      | 25.4   | 1.70               | 2.50            | ug/L  | 25.0  | ND            | 102  | 75-125      |       |           | D       |
| Nickel                            | 60      | 25.9   | 0.250              | 2.50            | ug/L  | 25.0  | 1.08          | 99.4 | 75-125      |       |           | D       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0827 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0827-BLK1)</b>       |         |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 02-Nov-2017 14:08                    |      |             |     |           |       |
| Mercury                           | ND      | 0.000100        | mg/L  |             |  |      |             |     |           | U     |
| <b>LCS (BFJ0827-BS1)</b>          |         |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 02-Nov-2017 14:10                    |      |             |     |           |       |
| Mercury                           | 0.00236 | 0.000100        | mg/L  | 0.00200     |  | 118  | 80-120      |     |           |       |
| <b>Duplicate (BFJ0827-DUP1)</b>   |         |                 |       |             | Source: 17J0430-09 Prepared: 30-Oct-2017 Analyzed: 02-Nov-2017 14:23 |      |             |     |           |       |
| Mercury                           | ND      | 0.000100        | mg/L  |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BFJ0827-MS1)</b> |         |                 |       |             | Source: 17J0430-09 Prepared: 30-Oct-2017 Analyzed: 02-Nov-2017 14:25 |      |             |     |           |       |
| Mercury                           | 0.00106 | 0.000100        | mg/L  | 0.00100     | ND   | 106  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0074 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0074-BLK1)</b> |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 16:54 |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0074-BS1)</b>    |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 17:15 |               |      |             |     |           |       |
| Lead                        | 208     | 25.8   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 103  | 80-120      |     |           |       |
| Arsenic                     | 75a     | 25.4   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 102  | 80-120      |     |           |       |
| Copper                      | 63      | 27.2   | 0.340           | 0.500           | ug/L  | 25.0  |               | 109  | 80-120      |     |           |       |
| Copper                      | 65      | 27.7   | 0.350           | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Nickel                      | 60      | 27.2   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 109  | 80-120      |     |           |       |
| Nickel                      | 62      | 26.9   | 0.220           | 0.500           | ug/L  | 25.0  |               | 108  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0885 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0885-BLK1)</b> |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 31-Oct-2017 Analyzed: 03-Nov-2017 17:05 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0101 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.288  | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFJ0885-BS1)</b> |       |        |        |      |       |   |      |        |  |  |   |
|                          |       |        |        |      |       | Prepared: 31-Oct-2017 Analyzed: 03-Nov-2017 17:25 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.08  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 104  | 80-120 |  |  |   |
| Calcium, Dissolved       | 9.79  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 97.9 | 80-120 |  |  |   |
| Iron, Dissolved          | 2.07  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 104  | 80-120 |  |  |   |
| Magnesium, Dissolved     | 10.7  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 107  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.504 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 101  | 80-120 |  |  |   |
| Potassium, Dissolved     | 9.34  | 0.0520 | 0.500  | mg/L | 10.0  |   | 93.4 | 80-120 |  |  |   |
| Silicon, Dissolved       | 10.5  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 105  | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.37  | 0.0114 | 0.500  | mg/L | 10.0  |   | 93.7 | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.7  | 1.90   | 50.0   | mg/L | 10.0  |   | 107  | 80-120 |  |  | J |

|                                 |        |        |                    |      |  |   |  |  |       |    |      |
|---------------------------------|--------|--------|--------------------|------|--|---|--|--|-------|----|------|
| <b>Duplicate (BFJ0885-DUP1)</b> |        |        |                    |      |  |   |  |  |       |    |      |
|                                 |        |        | Source: 17J0430-02 |      |  | Prepared: 31-Oct-2017 Analyzed: 03-Nov-2017 17:09 |  |  |       |    |      |
| Aluminum, Dissolved             | 0.0380 | 0.0085 | 0.0500             | mg/L |  | 0.0268  |  |  | 34.70 | 20 | L, J |
| Calcium, Dissolved              | 48.6   | 0.0051 | 0.0500             | mg/L |  | 48.1  |  |  | 0.98  | 20 |      |
| Iron, Dissolved                 | 0.0823 | 0.0013 | 0.0500             | mg/L |  | 0.0788  |  |  | 4.22  | 20 |      |
| Magnesium, Dissolved            | 60.4   | 0.0160 | 0.0500             | mg/L |  | 60.7  |  |  | 0.48  | 20 |      |
| Manganese, Dissolved            | 0.0107 | 0.0003 | 0.0010             | mg/L |  | 0.0107  |  |  | 0.41  | 20 |      |
| Potassium, Dissolved            | 11.0   | 0.0520 | 0.500              | mg/L |  | 11.0  |  |  | 0.36  | 20 |      |
| Silicon, Dissolved              | 4.97   | 0.0052 | 0.0600             | mg/L |  | 5.00  |  |  | 0.64  | 20 |      |
| Sodium, Dissolved               | 366    | 0.0114 | 0.500              | mg/L |  | 364   |  |  | 0.41  | 20 | E    |
| Sodium, Dissolved               | 347    | 1.90   | 50.0               | mg/L |  | 350   |  |  | 0.87  | 20 |      |

|                                   |      |        |                    |      |      |   |     |        |  |  |  |
|-----------------------------------|------|--------|--------------------|------|------|---|-----|--------|--|--|--|
| <b>Matrix Spike (BFJ0885-MS1)</b> |      |        |                    |      |      |   |     |        |  |  |  |
|                                   |      |        | Source: 17J0430-02 |      |      | Prepared: 31-Oct-2017 Analyzed: 03-Nov-2017 17:18 |     |        |  |  |  |
| Aluminum, Dissolved               | 2.17 | 0.0085 | 0.0500             | mg/L | 2.00 | 0.0268  | 107 | 75-125 |  |  |  |
| Calcium, Dissolved                | 58.4 | 0.0051 | 0.0500             | mg/L | 10.0 | 48.1  | 104 | 75-125 |  |  |  |
| Iron, Dissolved                   | 2.15 | 0.0013 | 0.0500             | mg/L | 2.00 | 0.0788  | 103 | 75-125 |  |  |  |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0885 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte                 | Result | Detection Limit           | Reporting Limit | Units   | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|-----------------|---|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0885-MS1)</b> |        | <b>Source: 17J0430-02</b> |                 | Prepared: 31-Oct-2017 Analyzed: 03-Nov-2017 17:18 |             |               |      |             |     |           |       |
| Magnesium, Dissolved              | 69.1   | 0.0160                    | 0.0500          | mg/L  | 10.0        | 60.7          | 83.5 | 75-125      |     |           |       |
| Manganese, Dissolved              | 0.512  | 0.0003                    | 0.0010          | mg/L  | 0.500       | 0.0107        | 100  | 75-125      |     |           |       |
| Potassium, Dissolved              | 22.1   | 0.0520                    | 0.500           | mg/L  | 10.0        | 11.0          | 111  | 75-125      |     |           |       |
| Silicon, Dissolved                | 15.9   | 0.0052                    | 0.0600          | mg/L  | 10.0        | 5.00          | 109  | 75-125      |     |           |       |
| Sodium, Dissolved                 | 369    | 0.0114                    | 0.500           | mg/L  | 10.0        | 364           | 48.9 | 75-125      |     |           | E     |
| Sodium, Dissolved                 | 349    | 1.90                      | 50.0            | mg/L  | 10.0        | 350           | NR   | 75-125      |     |           | HC    |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0037 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result  | Detection Limit | Reporting Limit                                   | Units | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|---------|---|-----------------|---|-------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0037-BLK1)</b>       |         | Prepared: 02-Nov-2017 Analyzed: 06-Nov-2017 18:41 |                 |   |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND  | 0.0680          | 0.100   | ug/L  |             |               |      |             |      |           | U     |
| Arsenic, Dissolved                | 75a     | ND  | 0.0220          | 0.200   | ug/L  |             |               |      |             |      |           | U     |
| Copper, Dissolved                 | 63      | ND  | 0.340           | 0.500   | ug/L  |             |               |      |             |      |           | U     |
| Copper, Dissolved                 | 65      | ND  | 0.350           | 0.500   | ug/L  |             |               |      |             |      |           | U     |
| Nickel, Dissolved                 | 60      | ND  | 0.0500          | 0.500   | ug/L  |             |               |      |             |      |           | U     |
| Nickel, Dissolved                 | 62      | ND  | 0.220           | 0.500   | ug/L  |             |               |      |             |      |           | U     |
| <b>LCS (BFK0037-BS1)</b>          |         | Prepared: 02-Nov-2017 Analyzed: 06-Nov-2017 19:02 |                 |   |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | 26.1  | 0.0680          | 0.100   | ug/L  | 25.0        |               | 104  | 80-120      |      |           |       |
| Arsenic, Dissolved                | 75a     | 28.2  | 0.0220          | 0.200   | ug/L  | 25.0        |               | 113  | 80-120      |      |           |       |
| Copper, Dissolved                 | 63      | 27.7  | 0.340           | 0.500   | ug/L  | 25.0        |               | 111  | 80-120      |      |           |       |
| Copper, Dissolved                 | 65      | 28.4  | 0.350           | 0.500   | ug/L  | 25.0        |               | 114  | 80-120      |      |           |       |
| Nickel, Dissolved                 | 60      | 27.3  | 0.0500          | 0.500   | ug/L  | 25.0        |               | 109  | 80-120      |      |           |       |
| Nickel, Dissolved                 | 62      | 27.5  | 0.220           | 0.500   | ug/L  | 25.0        |               | 110  | 80-120      |      |           |       |
| <b>Duplicate (BFK0037-DUP1)</b>   |         | <b>Source: 17J0430-10</b>                         |                 | Prepared: 02-Nov-2017 Analyzed: 06-Nov-2017 18:46 |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND  | 0.340           | 0.500   | ug/L  |             | ND            |      |             |      |           | U     |
| Arsenic, Dissolved                | 75a     | 51.0  | 0.110           | 1.00  | ug/L  |             | 52.3          |      |             | 2.44 | 20        | D     |
| Copper, Dissolved                 | 63      | ND  | 1.70            | 2.50  | ug/L  |             | ND            |      |             |      |           | U     |
| Nickel, Dissolved                 | 60      | 0.705   | 0.250           | 2.50  | ug/L  |             | 0.730         |      |             | 3.48 | 20        | J, D  |
| <b>Duplicate (BFK0037-DUP3)</b>   |         | <b>Source: 17J0430-10</b>                         |                 | Prepared: 02-Nov-2017 Analyzed: 09-Nov-2017 00:13 |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND  | 0.0680          | 0.100   | ug/L  |             | ND            |      |             |      |           | U     |
| <b>Matrix Spike (BFK0037-MS1)</b> |         | <b>Source: 17J0430-10</b>                         |                 | Prepared: 02-Nov-2017 Analyzed: 06-Nov-2017 18:55 |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | 24.8  | 0.340           | 0.500   | ug/L  | 25.0        | ND            | 99.2 | 75-125      |      |           | D     |
| Arsenic, Dissolved                | 75a     | 76.4  | 0.110           | 1.00  | ug/L  | 25.0        | 52.3          | 96.5 | 75-125      |      |           | D     |
| Copper, Dissolved                 | 63      | 26.0  | 1.70            | 2.50  | ug/L  | 25.0        | ND            | 104  | 75-125      |      |           | D     |
| Nickel, Dissolved                 | 60      | 25.9  | 0.250           | 2.50  | ug/L  | 25.0        | 0.730         | 100  | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0039 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result   | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|----------|---|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0039-BLK1)</b>       |          | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:12 |       |   |               |      |             |     |           |       |
| Mercury, Dissolved                | ND       | 0.000100  | mg/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0039-BS1)</b>          |          | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:14 |       |   |               |      |             |     |           |       |
| Mercury, Dissolved                | 0.00236  | 0.000100  | mg/L  | 0.00200   |               | 118  | 80-120      |     |           |       |
| <b>Duplicate (BFK0039-DUP1)</b>   |          | <b>Source: 17J0430-10</b>                         |       | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:40 |               |      |             |     |           |       |
| Mercury, Dissolved                | ND       | 0.000100  | mg/L  |   | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BFK0039-MS1)</b> |          | <b>Source: 17J0430-10</b>                         |       | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 15:42 |               |      |             |     |           |       |
| Mercury, Dissolved                | 0.000980 | 0.000100  | mg/L  | 0.00100   | ND            | 98.0 | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0084 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|------|-------------|-------|-----------|-------|
| <b>Blank (BFK0084-BLK1)</b>       |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 06-Nov-2017 16:23                    |      |             |       |           |       |
| Aluminum, Dissolved               | ND     | 0.0085          | 0.0500          | mg/L  |             |  |      |             |       |           | U     |
| Calcium, Dissolved                | ND     | 0.0051          | 0.0500          | mg/L  |             |  |      |             |       |           | U     |
| Iron, Dissolved                   | 0.0013 | 0.0013          | 0.0500          | mg/L  |             |  |      |             |       |           | J     |
| Magnesium, Dissolved              | ND     | 0.0160          | 0.0500          | mg/L  |             |  |      |             |       |           | U     |
| Manganese, Dissolved              | ND     | 0.0003          | 0.0010          | mg/L  |             |  |      |             |       |           | U     |
| Potassium, Dissolved              | ND     | 0.0520          | 0.500           | mg/L  |             |  |      |             |       |           | U     |
| Silicon, Dissolved                | ND     | 0.0052          | 0.0600          | mg/L  |             |  |      |             |       |           | U     |
| Sodium, Dissolved                 | ND     | 0.0114          | 0.500           | mg/L  |             |  |      |             |       |           | U     |
| Sodium, Dissolved                 | ND     | 1.90            | 50.0            | mg/L  |             |  |      |             |       |           | U     |
| <b>LCS (BFK0084-BS1)</b>          |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 06-Nov-2017 16:53                    |      |             |       |           |       |
| Aluminum, Dissolved               | 1.95   | 0.0085          | 0.0500          | mg/L  | 2.00        |  | 97.7 | 80-120      |       |           |       |
| Calcium, Dissolved                | 10.2   | 0.0051          | 0.0500          | mg/L  | 10.0        |  | 102  | 80-120      |       |           |       |
| Iron, Dissolved                   | 1.96   | 0.0013          | 0.0500          | mg/L  | 2.00        |  | 98.0 | 80-120      |       |           |       |
| Magnesium, Dissolved              | 10.4   | 0.0160          | 0.0500          | mg/L  | 10.0        |  | 104  | 80-120      |       |           |       |
| Manganese, Dissolved              | 0.473  | 0.0003          | 0.0010          | mg/L  | 0.500       |  | 94.7 | 80-120      |       |           |       |
| Potassium, Dissolved              | 9.29   | 0.0520          | 0.500           | mg/L  | 10.0        |  | 92.9 | 80-120      |       |           |       |
| Silicon, Dissolved                | 9.96   | 0.0052          | 0.0600          | mg/L  | 10.0        |  | 99.6 | 80-120      |       |           |       |
| Sodium, Dissolved                 | 9.99   | 0.0114          | 0.500           | mg/L  | 10.0        |  | 99.9 | 80-120      |       |           |       |
| Sodium, Dissolved                 | 9.88   | 1.90            | 50.0            | mg/L  | 10.0        |  | 98.8 | 80-120      |       |           | J     |
| <b>Duplicate (BFK0084-DUP1)</b>   |        |                 |                 |       |             | Source: 17J0430-10 Prepared: 03-Nov-2017 Analyzed: 06-Nov-2017 17:34 |      |             |       |           |       |
| Aluminum, Dissolved               | ND     | 0.0085          | 0.0500          | mg/L  |             | ND   |      |             |       |           | U     |
| Calcium, Dissolved                | 33.3   | 0.0051          | 0.0500          | mg/L  |             | 33.2   |      |             | 0.17  | 20        |       |
| Magnesium, Dissolved              | 92.5   | 0.0160          | 0.0500          | mg/L  |             | 91.3   |      |             | 1.32  | 20        |       |
| Potassium, Dissolved              | 54.7   | 0.0520          | 0.500           | mg/L  |             | 55.5   |      |             | 1.41  | 20        |       |
| Silicon, Dissolved                | 17.2   | 0.0052          | 0.0600          | mg/L  |             | 16.9   |      |             | 1.45  | 20        |       |
| Sodium, Dissolved                 | 1790   | 0.0114          | 0.500           | mg/L  |             | 1800   |      |             | 0.43  | 20        | E     |
| Sodium, Dissolved                 | 1760   | 1.90            | 50.0            | mg/L  |             | 1740   |      |             | 1.18  | 20        |       |
| <b>Duplicate (BFK0084-DUP3)</b>   |        |                 |                 |       |             | Source: 17J0430-10 Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 12:32 |      |             |       |           |       |
| Iron, Dissolved                   | 0.0335 | 0.0013          | 0.0500          | mg/L  |             | 0.0392   |      |             | 15.70 | 20        | J     |
| Manganese, Dissolved              | 0.0535 | 0.0003          | 0.0010          | mg/L  |             | 0.0512   |      |             | 4.40  | 20        |       |
| <b>Matrix Spike (BFK0084-MS1)</b> |        |                 |                 |       |             | Source: 17J0430-10 Prepared: 03-Nov-2017 Analyzed: 06-Nov-2017 17:48 |      |             |       |           |       |
| Aluminum, Dissolved               | 1.97   | 0.0085          | 0.0500          | mg/L  | 2.00        | ND   | 98.4 | 75-125      |       |           |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0084 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit           | Reporting Limit | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|-----------------|-------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFK0084-MS1)</b> |        | <b>Source: 17J0430-10</b> |                 |       | Prepared: 03-Nov-2017 |               | Analyzed: 06-Nov-2017 17:48 |             |     |           |       |
| Calcium, Dissolved                | 42.8   | 0.0051                    | 0.0500          | mg/L  | 10.0                  | 33.2          | 95.6                        | 75-125      |     |           |       |
| Magnesium, Dissolved              | 98.6   | 0.0160                    | 0.0500          | mg/L  | 10.0                  | 91.3          | 73.5                        | 75-125      |     |           | HC    |
| Potassium, Dissolved              | 68.6   | 0.0520                    | 0.500           | mg/L  | 10.0                  | 55.5          | 131                         | 75-125      |     |           | HC    |
| Silicon, Dissolved                | 26.0   | 0.0052                    | 0.0600          | mg/L  | 10.0                  | 16.9          | 90.1                        | 75-125      |     |           |       |
| Sodium, Dissolved                 | 1810   | 0.0114                    | 0.500           | mg/L  | 10.0                  | 1800          | 64.7                        | 75-125      |     |           | E     |
| Sodium, Dissolved                 | 1730   | 1.90                      | 50.0            | mg/L  | 10.0                  | 1740          | NR                          | 75-125      |     |           | HC    |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |       |                           |        |      |                       |        |                             |        |  |  |  |
|-----------------------------------|-------|---------------------------|--------|------|-----------------------|--------|-----------------------------|--------|--|--|--|
| <b>Matrix Spike (BFK0084-MS3)</b> |       | <b>Source: 17J0430-10</b> |        |      | Prepared: 03-Nov-2017 |        | Analyzed: 07-Nov-2017 12:42 |        |  |  |  |
| Iron, Dissolved                   | 1.84  | 0.0013                    | 0.0500 | mg/L | 2.00                  | 0.0392 | 89.9                        | 75-125 |  |  |  |
| Manganese, Dissolved              | 0.472 | 0.0003                    | 0.0010 | mg/L | 0.500                 | 0.0512 | 84.2                        | 75-125 |  |  |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

Wet Chemistry - Quality Control

Batch BFJ0705 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0705-BLK1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 24-Oct-2017 Analyzed: 24-Oct-2017 17:08                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| <b>LCS (BFJ0705-BS1)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 24-Oct-2017 Analyzed: 24-Oct-2017 17:28                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.51   | 0.100           | mg/L   | 1.50        |               | 100  | 90-110      |      |           |       |
| Chloride  | 1.53   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| Fluoride  | 1.54   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| Nitrate-N   | 1.56   | 0.100           | mg-N/L | 1.50        |               | 104  | 90-110      |      |           |       |
| Nitrite-N   | 1.53   | 0.100           | mg-N/L | 1.50        |               | 102  | 90-110      |      |           |       |
| Orthophosphorus   | 1.48   | 0.10            | mg-P/L | 1.50        |               | 98.3 | 90-110      |      |           |       |
| Sulfate   | 1.56   | 0.100           | mg/L   | 1.50        |               | 104  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0705-DUP1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0430-10 Prepared: 24-Oct-2017 Analyzed: 24-Oct-2017 19:31    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 2.15   | 0.100           | mg/L   |             | 2.16          |      |             | 0.42 | 20        |       |
| Fluoride  | 0.101  | 0.100           | mg/L   |             | ND            |      |             |      |           |       |
| Nitrate-N   | 1.23   | 0.100           | mg-N/L |             | 1.23          |      |             | 0.08 | 20        |       |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Orthophosphorus   | 0.54   | 0.10            | mg-P/L |             | 0.54          |      |             | 1.11 | 20        |       |
| <b>Duplicate (BFJ0705-DUP2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0430-10RE1 Prepared: 24-Oct-2017 Analyzed: 26-Oct-2017 01:04 |        |                 |        |             |               |      |             |      |           |       |
| Sulfate   | 11.7   | 0.500           | mg/L   |             | 11.0          |      |             | 6.09 | 20        | D     |
| <b>Duplicate (BFJ0705-DUP3)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0430-10RE2 Prepared: 24-Oct-2017 Analyzed: 26-Oct-2017 22:50 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 2360   | 200             | mg/L   |             | 2420          |      |             | 2.30 | 20        | D     |
| <b>Duplicate (BFJ0705-DUP4)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0430-10RE2 Prepared: 24-Oct-2017 Analyzed: 26-Oct-2017 23:11 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 2400   | 200             | mg/L   |             | 2420          |      |             | 0.84 | 20        | D     |
| <b>Matrix Spike (BFJ0705-MS1)</b>                                       |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0430-10 Prepared: 24-Oct-2017 Analyzed: 24-Oct-2017 19:51    |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 1.70   | 0.100           | mg/L   | 2.00        | ND            | 85.0 | 75-125      |      |           |       |
| Nitrite-N   | 1.73   | 0.100           | mg-N/L | 2.00        | ND            | 86.4 | 75-125      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

Wet Chemistry - Quality Control

Batch BFJ0705 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

| Matrix Spike (BFJ0705-MS2) |      | Source: 17J0430-10 |        | Prepared: 24-Oct-2017 |      | Analyzed: 25-Oct-2017 10:46 |        |  |  |   |
|----------------------------|------|--------------------|--------|-----------------------|------|-----------------------------|--------|--|--|---|
| Bromide                    | 4.57 | 0.200              | mg/L   | 2.00                  | 2.16 | 121                         | 75-125 |  |  | D |
| Fluoride                   | 2.01 | 0.200              | mg/L   | 2.00                  | ND   | 100                         | 75-125 |  |  | D |
| Nitrate-N                  | 3.61 | 0.200              | mg-N/L | 2.00                  | 1.23 | 119                         | 75-125 |  |  | D |
| Orthophosphorus            | 2.71 | 0.20               | mg-P/L | 2.00                  | 0.54 | 109                         | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

| Matrix Spike (BFJ0705-MS3) |      | Source: 17J0430-10RE1 |      | Prepared: 24-Oct-2017 |      | Analyzed: 26-Oct-2017 02:04 |        |  |  |   |
|----------------------------|------|-----------------------|------|-----------------------|------|-----------------------------|--------|--|--|---|
| Sulfate                    | 30.3 | 2.00                  | mg/L | 20.0                  | 11.0 | 96.3                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
16-Nov-2017 15:08

**Wet Chemistry - Quality Control**

**Batch BFJ0728 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0728-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 08:06 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0728-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 08:06 |      |             |      |           |       |
| Dissolved Solids                | 508    | 5.0                       | mg/L  | 500         |   | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0728-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17J0430-10</b> |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 08:06 |      |             |      |           |       |
| Dissolved Solids                | 4140   | 100                       | mg/L  |             | 4100  |      |             | 0.97 | 20        |       |





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Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

**Wet Chemistry - Quality Control**

**Batch BFJ0752 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte  | Result | Reporting Limit | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|--|--------|-----------------|------------|-------------|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0752-BLK1)</b>  |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 15:31                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Blank (BFJ0752-BLK2)</b>  |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 17:45                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | ND     | 1.00            | mg/L CaCO3 |             |               |      |              |      |           | U     |
| <b>Duplicate (BFJ0752-DUP1)</b>                                      |        |                 |            |             |               |      |              |      |           |       |
| Source: 17J0430-10 Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 15:31 |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | 473    | 1.00            | mg/L CaCO3 |             | 478           |      |              | 1.03 | 20        |       |
| <b>Reference (BFJ0752-SRM1)</b>                                      |        |                 |            |             |               |      |              |      |           |       |
| Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 15:31                    |        |                 |            |             |               |      |              |      |           |       |
| Alkalinity, Total  | 101    | 1.00            | mg/L CaCO3 | 108         |               | 93.9 | 90.37-108.33 |      |           |       |



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Project Manager: Troy Bussey Jr.

Reported:  
16-Nov-2017 15:08

Wet Chemistry - Quality Control

Batch BFK0217 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: GM

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFK0217-BLK1)</b>         |        |                 |       |             | Prepared: 08-Nov-2017 Analyzed: 09-Nov-2017 17:20                    |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50            | mg/L  |             |  |      |             |      |           | U     |
| <b>Duplicate (BFK0217-DUP1)</b>     |        |                 |       |             | Source: 17J0430-10 Prepared: 08-Nov-2017 Analyzed: 09-Nov-2017 20:56 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 17.0   | 1.00            | mg/L  |             | 15.4   |      |             | 9.94 | 20        | D     |
| <b>Matrix Spike (BFK0217-MS2)</b>   |        |                 |       |             | Source: 17J0430-10 Prepared: 08-Nov-2017 Analyzed: 14-Nov-2017 00:28 |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 35.6   | 1.00            | mg/L  | 20.0        | 15.4   | 101  | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Reported:  
16-Nov-2017 15:08

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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16-Nov-2017 15:08

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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Reported:  
16-Nov-2017 15:08

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



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**Reported:**  
16-Nov-2017 15:08

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Reported:  
16-Nov-2017 15:08

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



14 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

17J0453

Associated SDG ID(s)

N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17J0453**  
 ARI Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project #: **Arkema FS DG Inv 79227**  
 Samplers: **D Cooper 206-860-3466 / T Dreher / L Kerner / D Pickering**

Turn-around Requested: **Normal**  
 Date: **10-24-17**  
 Page: **1** of **2**  
 No. of Coolers: **1**  
 Cooler Temps: **2**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4811 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID            | Date     | Time  | Matrix | No. Containers | Analysis Requested                       |  |  |   |   |  |                                   |                         |   |   | Notes/Comments |   |  |
|----------------------|----------|-------|--------|----------------|--|--|--|---|---|--|-----------------------------------|-------------------------|---|---|----------------|---|--|
|                      |          |       |        |                | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B |   |   |                |   |  |
| GW-7E6-2-102417      | 10-24-17 | 8:55  | Water  | 4              | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X | All dissolved samples field filtered 0.45umf |
| GW-7E6-2-102417-(20) |          | 8:55  |        | 4              | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-7EB-1-102417      |          | 9:00  |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-7EB-1-102417-(20) |          | 9:00  |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-7E6-2-102417      |          | 10:00 |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-7E6-2-102417-(20) |          | 10:00 |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-6E2-1-102417      |          | 10:05 |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-6E2-1-102417-(20) |          | 10:05 |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-6E6-1-102417      |          | 11:00 |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-6E6-1-102417-(20) |          | 11:00 |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |
| GW-7E3-1-102417      |          | 11:05 |        |                | X  | X  | X  | X   | X   | X  | X                                 | X                       | X | X | X              | X |  |

Relinquished by (Signature): *[Signature]* Printed Name: **Luke Kerner** Company: **ARI** Date & Time: **10-24-17 1500**

Relinquished by (Signature): *[Signature]* Printed Name: **Brandon Fisk** Company: **ARI** Date & Time: **10-24-17 1600**

Received by (Signature): *[Signature]* Printed Name: **ARI** Company: **ARI** Date & Time: **10-24-17 1600**

Comments/Special Instructions: Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227

Limit of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under P-SDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: **10-24-17**  
 Page: **2** of **2**  
 No. of Coolers: **2**  
 Cooler Temps:

Turn-around Requested: **Normal**  
 Phone: **360-570-1700**  
 Pioneer Technologies  
 Client Contact:  
 Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name:  
 Arkema FS DG Inv  
 Client Project #: **79227**

| Sample ID  | Date     | Time | Matrix | No. Containers | Analysis Requested                          |  |  |   |   |  |                                      |                            |   |   | Notes/Comments |   |   |
|--|----------|------|--------|----------------|---|--|--|---|---|--|--------------------------------------|----------------------------|---|---|----------------|---|---|
|  |          |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 8010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Chloride, Fluoride, Nitrate<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 180.1 | Dissolved DOC<br>SM 5310 B |   |   |                |   |   |
| GW-TE3-1-102417-(20)   | 10-24-17 | 1105 | water  | 4              | X   | X  | X  | X   | X   | X  | X                                    | X                          | X | X | X              | X | All dissolved samples field filtered 0.45um |
| GW-6B19-2-102417   |          | 1235 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X | X | X              | X |   |
| GW-6B19-2-102417-(20)  |          | 1235 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X | X | X              | X |   |
| GW-6B19-2-102417-(01)  |          | 1240 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X | X | X              | X |   |
| GW-6B19-2-102417-(21)  |          | 1240 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X | X | X              | X |   |
| GW-6D25-2-102417   |          | 1440 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X | X | X              | X |   |
| GW-6D25-2-102417-(20)  |          | 1440 |        |                | X   | X  | X  | X   | X   | X  | X                                    | X                          | X | X | X              | X |   |
| Comments/Special Instructions  |          |      |        |                | Relinquish by (Signature)                   | Relinquish by (Signature)                          |  |   |   |  |                                      |                            |   |   |                |   | Received by (Signature)                     |
| Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 |          |      |        |                | Printed Name: Luke Kerma                    | Printed Name: Brandon Fisk                         |  |   |   |  |                                      |                            |   |   |                |   | Printed Name:                               |
|  |          |      |        |                | Company: DOF                                | Company: ARI                                       |  |   |   |  |                                      |                            |   |   |                |   | Company:                                    |
|  |          |      |        |                | Date & Time: 10-24-17                       | Date & Time: 10/24/17                              |  |   |   |  |                                      |                            |   |   |                |   | Date & Time:                                |

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WORK ORDER

17J0453

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                    | pH       |
|--------------|-----------------------------------|----------|
| 17J0453-01 A | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-01 B | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-01 C | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-01 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 fail |
| 17J0453-02 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass |
| 17J0453-02 B | Small OJ, 500 mL                  |          |
| 17J0453-02 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2 fail |
| 17J0453-02 D | Large OJ, 1000 mL                 |          |
| 17J0453-03 A | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-03 B | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-03 C | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-03 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 fail |
| 17J0453-04 A | Glass NM, Amber, 250 mL, 9N H2SO4 | > 2 fail |
| 17J0453-04 B | Small OJ, 500 mL                  |          |
| 17J0453-04 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2 fail |
| 17J0453-04 D | Large OJ, 1000 mL                 |          |
| 17J0453-05 A | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-05 B | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-05 C | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-05 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass |
| 17J0453-06 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass |
| 17J0453-06 B | Small OJ, 500 mL                  |          |
| 17J0453-06 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 pass |
| 17J0453-06 D | Large OJ, 1000 mL                 |          |
| 17J0453-07 A | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-07 B | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-07 C | VOA Vial, Clear, 40 mL, HCL       |          |
| 17J0453-07 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass |
| 17J0453-08 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass |
| 17J0453-08 B | Small OJ, 500 mL                  |          |
| 17J0453-08 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 pass |



WORK ORDER

17J0453

|  |                                   |  |
|--|-----------------------------------|--|
| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |
| 17J0453-08 D   | Large OJ, 1000 mL                 |  |
| 17J0453-09 A   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-09 B   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-09 C   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-09 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2 fail  |
| 17J0453-10 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass  |
| 17J0453-10 B   | Small OJ, 500 mL                  |  |
| 17J0453-10 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2 fail  |
| 17J0453-10 D   | Large OJ, 1000 mL                 |  |
| 17J0453-11 A   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-11 B   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-11 C   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-11 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2 pass  |
| 17J0453-12 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass  |
| 17J0453-12 B   | Small OJ, 500 mL                  |  |
| 17J0453-12 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 pass  |
| 17J0453-12 D   | Large OJ, 1000 mL                 |  |
| 17J0453-13 A   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-13 B   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-13 C   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-13 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2 pass  |
| 17J0453-14 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass  |
| 17J0453-14 B   | Small OJ, 500 mL                  |  |
| 17J0453-14 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 pass  |
| 17J0453-14 D   | Large OJ, 1000 mL                 |  |
| 17J0453-15 A   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-15 B   | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-15 C   | VOA Vial, Clear, 40 mL, HCL       | <2 pass PF 10/25/17  |
| 17J0453-15 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2 pass  |
| 17J0453-16 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass  |
| 17J0453-16 B   | Small OJ, 500 mL                  |  |
| 17J0453-16 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2 pass  |
| 17J0453-16 D   | Large OJ, 1000 mL                 |  |
| 17J0453-17 A   | VOA Vial, Clear, 40 mL, HCL       |  |





WORK ORDER

17J0453

|   |                                   |   |      |
|---|-----------------------------------|---|------|
| <b>Client: Pioneer Technologies Corporation</b>                 |                                   | <b>Project Manager: Amanda Volgardsen</b>                         |      |
| <b>Project: Port of Tacoma Arkema- FS Data Gap Investigatio</b> |                                   | <b>Project Number: Port of Tacoma Arkema- FS Data Gap Investi</b> |      |
| 17J0453-17 B  | VOA Vial, Clear, 40 mL, HCL       |   |      |
| 17J0453-17 C  | VOA Vial, Clear, 40 mL, HCL       |   |      |
| 17J0453-17 D  | HDPE NM, 500 mL, 1:1 HNO3         | L2  | pass |
| 17J0453-18 A  | Glass NM, Amber, 250 mL, 9N H2SO4 | L2  | pass |
| 17J0453-18 B  | Small OJ, 500 mL                  |   |      |
| 17J0453-18 C  | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2  | pass |
| 17J0453-18 D  | Large OJ, 1000 mL                 |   |      |
| 17J0453-19 A  | VOA Vial, Clear, 40 mL            |   |      |

Preservation Confirmed By BF

Date 10/25/17



# Cooler Receipt Form

ARI Client: Pioneer

Project Name: Arkeman

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17J0453

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO   
 Were custody papers included with the cooler? ..... YES  NO   
 Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO   
 Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
 Time: 7.8 9.3

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 12002565

Cooler Accepted by: BF Date: 10/24/17 Time: 1600

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO   
 What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? ..... NA YES  NO   
 Were all bottles sealed in individual plastic bags? ..... YES  NO   
 Did all bottles arrive in good condition (unbroken)? ..... YES  NO   
 Were all bottle labels complete and legible? ..... YES  NO   
 Did the number of containers listed on COC match with the number of containers received? ..... YES  NO   
 Did all bottle labels and tags agree with custody papers? ..... YES  NO   
 Were all bottles used correct for the requested analyses? ..... YES  NO   
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO   
 Were all VOC vials free of air bubbles? ..... NA YES  NO   
 Was sufficient amount of sample sent in each bottle? ..... YES  NO   
 Date VOC Trip Blank was made at ARI.....  NA \_\_\_\_\_  
 Was Sample Split by ARI :  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

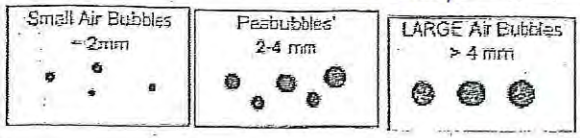
Samples Logged by: BF Date: 10/25/17 Time: 800

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**  
TB was not listed on COC  
air bubbles  
 7E6-2 - 1 vial w/sm, 1 w/pb  
 6E2-1 - 2 w/sm  
 6E6-1 - 1 w/sm, 1 w/lg  
 7E3-1 - 1 w/lg, 1 w/pb  
 6B19-2-... - (01) - 3 w/lg  
 6D25-2, 1 w/lg, 2 w/pb

By: BF Date: 10/25/17



Small → "sm" (<math>< 2\text{ mm}</math>)  
 Peabubbles → "pb" (2 to <math>4\text{ mm}</math>)  
 Large → "lg" (4 to <math>6\text{ mm}</math>)  
 Headspace → "hs" (> <math>6\text{ mm}</math>)





# Cooler Temperature Compliance Form

Cooler#: 1                                    Temperature(°C): 7.9

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |

Cooler#: 2                                    Temperature(°C): 9.3

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |

Cooler#:                                    Temperature(°C):

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |

Cooler#:                                    Temperature(°C):

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |
|           |              |             |

Completed by: BSF                                    Date: 10/24/17                                    Time: 1600



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID             | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-----------------------|---------------|--------|-------------------|-------------------|
| GW-7E6-2-102417       | 17J0453-01    | Water  | 24-Oct-2017 08:55 | 24-Oct-2017 16:00 |
| GW-7E6-2-102417-(20)  | 17J0453-02    | Water  | 24-Oct-2017 08:55 | 24-Oct-2017 16:00 |
| GW-7E8-1-102417       | 17J0453-03    | Water  | 24-Oct-2017 09:00 | 24-Oct-2017 16:00 |
| GW-7E8-1-102417-(20)  | 17J0453-04    | Water  | 24-Oct-2017 09:00 | 24-Oct-2017 16:00 |
| GW-7E16-2-102417      | 17J0453-05    | Water  | 24-Oct-2017 10:00 | 24-Oct-2017 16:00 |
| GW-7E16-2-102417-(20) | 17J0453-06    | Water  | 24-Oct-2017 10:00 | 24-Oct-2017 16:00 |
| GW-6E2-1-102417       | 17J0453-07    | Water  | 24-Oct-2017 10:05 | 24-Oct-2017 16:00 |
| GW-6E2-1-102417-(20)  | 17J0453-08    | Water  | 24-Oct-2017 10:05 | 24-Oct-2017 16:00 |
| GW-6E6-1-102417       | 17J0453-09    | Water  | 24-Oct-2017 11:00 | 24-Oct-2017 16:00 |
| GW-6E6-1-102417-(20)  | 17J0453-10    | Water  | 24-Oct-2017 11:00 | 24-Oct-2017 16:00 |
| GW-7E3-1-102417       | 17J0453-11    | Water  | 24-Oct-2017 11:05 | 24-Oct-2017 16:00 |
| GW-7E3-1-102417-(20)  | 17J0453-12    | Water  | 24-Oct-2017 11:05 | 24-Oct-2017 16:00 |
| GW-6B19-2-102417      | 17J0453-13    | Water  | 24-Oct-2017 12:35 | 24-Oct-2017 16:00 |
| GW-6B19-2-102417-(20) | 17J0453-14    | Water  | 24-Oct-2017 12:35 | 24-Oct-2017 16:00 |
| GW-6B19-2-102417-(01) | 17J0453-15    | Water  | 24-Oct-2017 12:40 | 24-Oct-2017 16:00 |
| GW-6B19-2-102417-(21) | 17J0453-16    | Water  | 24-Oct-2017 12:40 | 24-Oct-2017 16:00 |
| GW-6D25-2-102417      | 17J0453-17    | Water  | 24-Oct-2017 14:40 | 24-Oct-2017 16:00 |
| GW-6D25-2-102417-(20) | 17J0453-18    | Water  | 24-Oct-2017 14:40 | 24-Oct-2017 16:00 |
| TB                    | 17J0453-19    | Water  | 24-Oct-2017 00:00 | 24-Oct-2017 16:00 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 24, 2017 under ARI workorder 17J0453. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Samples GW-7E6-2-102417 and GW-7E8-1-102417 were reanalyzed at higher reporting limits due to compounds exceeding the upper calibration ranges. These compounds have been flagged with an "E" qualifier in the initial runs. No further corrective action was taken.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

Method blank BFJ0769 has Tetrachloroethene detected below the reporting limit, but above the method detection limit. Tetrachloroethene has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E16-2-102417-(20). The matrix spike percent recovery was within QC limits. The duplicate has a Mercury concentration  $\leq 5$  times the reporting limits, and the replicate control limit defaults to +/- the reporting limit instead of 20% of the RPD. The Mercury has been flagged with an "L" qualifier on the duplicate. This is likely due to matrix interference. The results are advisory. No further corrective action was taken.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

Initial and continuing calibrations were within method requirements.

Method blank BFK0004-MB1 has Nickel detected below the reporting limit, but above the method detection limit. Method blank BFK0004-MB2 has Arsenic detected below the reporting limit, but above the method detection limit. These metals have been flagged with a "J" qualifier on the associated method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E16-2-102417. The matrix spike percent recoveries were within QC limits. The duplicate BFK0004-DUP2 has a high RPD for Nickel. This is likely due to matrix interference. The results are advisory. No corrective action was taken.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFJ0885 has Sodium detected below the reporting limit, but above the method detection limit. The Sodium has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

#### **Anions - EPA Method 300.0**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-7E6-2-102417-(20) and its reanalysis. The matrix spike percent recoveries and duplicate RPD were within QC limits.

A Fluoride only matrix spike and duplicate were prepared in conjunction with the reanalysis of sample GW-7E3-1-102417-(20) due to the Fluoride being diluted from the QC of GW-7E6-2-102417-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

The SRM percent recovery were within control limits.

**Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

**Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.



WORK ORDER

17J0453

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                    | pH                                       |
|--------------|-----------------------------------|--|
| 17J0453-01 A | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-01 B | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-01 C | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-01 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 fail                                 |
| 17J0453-02 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass                                 |
| 17J0453-02 B | Small OJ, 500 mL                  |  |
| 17J0453-02 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2 fail                                 |
| 17J0453-02 D | Large OJ, 1000 mL                 |  |
| 17J0453-03 A | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-03 B | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-03 C | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-03 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 fail                                 |
| 17J0453-04 A | Glass NM, Amber, 250 mL, 9N H2SO4 | > 2 fail // < 2 2ml H2SO4 9N 10-25-17 LW |
| 17J0453-04 B | Small OJ, 500 mL                  |  |
| 17J0453-04 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2 fail                                 |
| 17J0453-04 D | Large OJ, 1000 mL                 |  |
| 17J0453-05 A | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-05 B | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-05 C | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-05 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass                                 |
| 17J0453-06 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass                                 |
| 17J0453-06 B | Small OJ, 500 mL                  |  |
| 17J0453-06 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 pass                                 |
| 17J0453-06 D | Large OJ, 1000 mL                 |  |
| 17J0453-07 A | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-07 B | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-07 C | VOA Vial, Clear, 40 mL, HCL       |  |
| 17J0453-07 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass                                 |
| 17J0453-08 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass                                 |
| 17J0453-08 B | Small OJ, 500 mL                  |  |
| 17J0453-08 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 pass                                 |





WORK ORDER

17J0453

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

|              |                                   |                         |
|--------------|-----------------------------------|-------------------------|
| 17J0453-08 D | Large OJ, 1000 mL                 |                         |
| 17J0453-09 A | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-09 B | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-09 C | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-09 D | HDPE NM, 500 mL, 1:1 HNO3         | > 2 fail                |
| 17J0453-10 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass                |
| 17J0453-10 B | Small OJ, 500 mL                  |                         |
| 17J0453-10 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2 fail                |
| 17J0453-10 D | Large OJ, 1000 mL                 |                         |
| 17J0453-11 A | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-11 B | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-11 C | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-11 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass                |
| 17J0453-12 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass                |
| 17J0453-12 B | Small OJ, 500 mL                  |                         |
| 17J0453-12 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 pass                |
| 17J0453-12 D | Large OJ, 1000 mL                 |                         |
| 17J0453-13 A | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-13 B | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-13 C | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-13 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass                |
| 17J0453-14 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass                |
| 17J0453-14 B | Small OJ, 500 mL                  |                         |
| 17J0453-14 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 pass                |
| 17J0453-14 D | Large OJ, 1000 mL                 |                         |
| 17J0453-15 A | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-15 B | VOA Vial, Clear, 40 mL, HCL       |                         |
| 17J0453-15 C | VOA Vial, Clear, 40 mL, HCL       | < 2 pass                |
| 17J0453-15 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 pass<br>PI 10/25/17 |
| 17J0453-16 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 pass                |
| 17J0453-16 B | Small OJ, 500 mL                  |                         |
| 17J0453-16 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 pass                |
| 17J0453-16 D | Large OJ, 1000 mL                 |                         |
| 17J0453-17 A | VOA Vial, Clear, 40 mL, HCL       |                         |



WORK ORDER

17J0453

|  |                                   |  |      |
|--|-----------------------------------|--|------|
| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |      |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |      |
| 17J0453-17 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0453-17 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0453-17 D   | HDPE NM, 500 mL, 1:1 HNO3         | L2   | pass |
| 17J0453-18 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | L2   | pass |
| 17J0453-18 B   | Small OJ, 500 mL                  |  |      |
| 17J0453-18 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2   | pass |
| 17J0453-18 D   | Large OJ, 1000 mL                 |  |      |
| 17J0453-19 A   | VOA Vial, Clear, 40 mL            |  |      |

BF  
Preservation Confirmed By

10/25/17  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**GW-7E6-2-102417**  
**17J0453-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/24/2017 08:55  
Analyzed: 25-Oct-2017 18:39

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0736 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units  | Notes |
|--|------------|----------|-----------------|-----------------|------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>203</b> | ug/L   | E     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>154</b> | ug/L   | E     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>156</b> | ug/L   | E     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>655</b> | ug/L   | E     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %   | 91.3 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %   | 93.5 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %   | 93.6 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %   | 101 %  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417**  
**17J0453-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 08:55  
Analyzed: 07-Nov-2017 20:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>1.62</b> | ug/L  | D     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417**  
**17J0453-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 08:55  
Analyzed: 07-Nov-2017 20:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>724</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>21.6</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>22.1</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417**  
**17J0453-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 08:55  
Analyzed: 02-Nov-2017 14:37

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**GW-7E6-2-102417**  
**17J0453-01RE1 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/24/2017 08:55  
Analyzed: 26-Oct-2017 12:44

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0769 Sample Size: 0.05 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--|------------|----------|-----------------|-----------------|------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 11.4            | 40.0            | <b>254</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 5.46            | 40.0            | <b>186</b> | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 9.78            | 40.0            | <b>192</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 9.48            | 40.0            | <b>962</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %   | 94.3  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %   | 96.7  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %   | 91.5  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %   | 99.3  | %     |



Pioneer Technologies Corporation  
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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 08:55  
Analyzed: 03-Nov-2017 19:48

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0981</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>4.45</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.487</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.325</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0198</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>40.8</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>42.6</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>2600</b>   | mg/L  |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 08:55  
Analyzed: 09-Nov-2017 04:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | <b>0.700</b> | ug/L  | D     |



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 08:55  
Analyzed: 09-Nov-2017 04:31

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>347</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>9.10</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>15.7</b> | ug/L  | D     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 08:55  
Analyzed: 08-Nov-2017 13:46

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 08:55  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>5740</b> | mg/L  |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 08:55  
Analyzed: 25-Oct-2017 12:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/24/2017 08:55  
Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 694    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 986    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1680   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 08:55  
Analyzed: 11-Nov-2017 15:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5.265    | 2.63            | <b>250</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 08:55  
Analyzed: 25-Oct-2017 18:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>9.16</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.734</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>3.90</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>9.41</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E6-2-102417-(20)**  
**17J0453-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 08:55  
Analyzed: 27-Oct-2017 00:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>2910</b> | mg/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-7E8-1-102417**  
**17J0453-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/24/2017 09:00  
Analyzed: 25-Oct-2017 19:05

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0736 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>1.04</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>6.28</b> | ug/L   |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>276</b>  | ug/L   | E     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>1380</b> | ug/L   | E     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 99.0 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 90.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 92.6 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 103 %  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417**  
**17J0453-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 09:00  
Analyzed: 08-Nov-2017 21:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>6.64</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417**  
**17J0453-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 09:00  
Analyzed: 08-Nov-2017 21:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>4020</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 10       | 3.40            | 5.00            | <b>20.5</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>73.2</b> | ug/L  | D     |





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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417**  
**17J0453-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 09:00  
Analyzed: 02-Nov-2017 14:39

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000100</b> | mg/L  |       |



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Reported:  
14-Nov-2017 14:41

**GW-7E8-1-102417**  
**17J0453-03RE1 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/24/2017 09:00  
Analyzed: 26-Oct-2017 13:09

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0769 Sample Size: 0.02 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 28.6            | 100             | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 13.7            | 100             | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 24.5            | 100             | 214      | ug/L   |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 23.7            | 100             | 2520     | ug/L   |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 95.7 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 92.2 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 98.7 % |       |



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Reported:  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 09:00  
Analyzed: 03-Nov-2017 19:16

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 10       | 0.0850          | 0.500           | <b>0.559</b>  | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 10       | 0.0510          | 0.500           | <b>1.48</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 10       | 0.0130          | 0.500           | <b>0.713</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 10       | 0.160           | 0.500           | ND            | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 10       | 0.0034          | 0.0100          | <b>0.0136</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 10       | 0.520           | 5.00            | <b>30.4</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 10       | 0.0520          | 0.600           | <b>725</b>    | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 10       | 19.0            | 500             | <b>4450</b>   | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 09:00  
Analyzed: 09-Nov-2017 03:29

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>5.60</b> | ug/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 09:00  
Analyzed: 09-Nov-2017 03:29

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3430</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>18.1</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>61.2</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 09:00  
Analyzed: 08-Nov-2017 13:48

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000100</b> | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 09:00  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>11300</b> | mg/L  |       |



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Reported:  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 09:00  
Analyzed: 25-Oct-2017 13:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | 7.68   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | 5.94   | mg-P/L | D     |





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Reported:  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/24/2017 09:00

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 2510   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | 665    | mg/L CaCO3 |       |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 3180   | mg/L CaCO3 |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 09:00  
Analyzed: 11-Nov-2017 15:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5.986    | 2.99            | <b>293</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 09:00  
Analyzed: 27-Oct-2017 02:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>4970</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E8-1-102417-(20)**  
**17J0453-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 09:00  
Analyzed: 27-Oct-2017 05:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>238</b> | mg/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-7E16-2-102417**  
**17J0453-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/24/2017 10:00  
Analyzed: 26-Oct-2017 13:35

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0769 Sample Size: 10 mL  
Prepared: 26-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>2.68</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.73</b> | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>8.77</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>24.9</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 91.6  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 89.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 99.6  | %     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417**  
**17J0453-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 10:00  
Analyzed: 08-Nov-2017 22:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2550</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417**  
**17J0453-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 10:00  
Analyzed: 02-Nov-2017 14:40

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417**  
**17J0453-05RE1 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 10:00  
Analyzed: 08-Nov-2017 22:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |





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Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417**  
**17J0453-05RE1 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 10:00  
Analyzed: 08-Nov-2017 22:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>2.96</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>4.61</b> | ug/L  | D     |



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Olympia WA, 98503

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Reported:  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 10:00  
Analyzed: 03-Nov-2017 19:55

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 49.7   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 5.57   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 45.3   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 0.170  | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 20.7   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 29.8   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | 676    | mg/L  |       |



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Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 10:00  
Analyzed: 09-Nov-2017 03:45

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 10:00  
Analyzed: 09-Nov-2017 19:20

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2910</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>2.49</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>4.85</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 10:00  
Analyzed: 08-Nov-2017 13:50

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 10:00  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 50 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1990</b> | mg/L  |       |



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Reported:  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 10:00  
Analyzed: 25-Oct-2017 14:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.364</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.548</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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Reported:  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/24/2017 10:00

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 531    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 531    | mg/L CaCO3 |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 10:00  
Analyzed: 11-Nov-2017 16:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>5.70</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 10:00  
Analyzed: 27-Oct-2017 02:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>815</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-7E16-2-102417-(20)**  
**17J0453-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 10:00  
Analyzed: 27-Oct-2017 06:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>38.8</b> | mg/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-6E2-1-102417**  
**17J0453-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/24/2017 10:05  
Analyzed: 02-Nov-2017 10:07

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND              | ug/L          | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.54</b>     | ug/L          |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>2.42</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>5.90</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>104 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>95.7 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>89.5 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>103 %</i>  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417**  
**17J0453-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 10:05  
Analyzed: 08-Nov-2017 21:33

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 200      | 13.6            | 20.0            | ND     | ug/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417**  
**17J0453-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 10:05  
Analyzed: 08-Nov-2017 21:33

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 200      | 4.40            | 40.0            | <b>21500</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 2        | 0.680           | 1.00            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>22.8</b>  | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417**  
**17J0453-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 10:05  
Analyzed: 02-Nov-2017 14:42

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417**  
**17J0453-07RE1 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 10:05  
Analyzed: 08-Nov-2017 23:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |





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Reported:  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 10:05  
Analyzed: 03-Nov-2017 19:25

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 13.9   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 34.1   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 11.2   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 0.247  | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 42.0   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 32.1   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | 1280   | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 10:05  
Analyzed: 09-Nov-2017 04:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 10:05  
Analyzed: 09-Nov-2017 19:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 100      | 2.20            | 20.0            | <b>10700</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>11.0</b>  | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 10:05  
Analyzed: 08-Nov-2017 13:59

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 10:05  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>3470</b> | mg/L  |       |



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Reported:  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 10:05  
Analyzed: 25-Oct-2017 14:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.828</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.179</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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Reported:  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/24/2017 10:05  
Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 410    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 410    | mg/L CaCO3 |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 10:05  
Analyzed: 11-Nov-2017 16:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>4.76</b> | mg/L  | D     |





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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 10:05  
Analyzed: 27-Oct-2017 03:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1880</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E2-1-102417-(20)**  
**17J0453-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 10:05  
Analyzed: 27-Oct-2017 06:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>127</b> | mg/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-6E6-1-102417**  
**17J0453-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/24/2017 11:00  
Analyzed: 02-Nov-2017 10:30

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 1 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | <b>0.63</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | <b>1.44</b> | ug/L  | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | <b>10.8</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 110   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 94.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 86.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 103   | %     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417**  
**17J0453-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 11:00  
Analyzed: 08-Nov-2017 21:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 50       | 3.40            | 5.00            | <b>25.1</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417**  
**17J0453-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 11:00  
Analyzed: 08-Nov-2017 21:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 50       | 1.10            | 10.0            | <b>5310</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>78.8</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>24.0</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417**  
**17J0453-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 11:00  
Analyzed: 02-Nov-2017 14:44

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000770</b> | mg/L  |       |



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Reported:  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 11:00  
Analyzed: 03-Nov-2017 20:15

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 10       | 0.0850          | 0.500           | <b>0.553</b>  | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 10       | 0.0510          | 0.500           | <b>2.10</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 10       | 0.0130          | 0.500           | <b>1.96</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 10       | 0.160           | 0.500           | <b>0.183</b>  | mg/L  | J, D  |
| Manganese, Dissolved | 7439-96-5  | 10       | 0.0034          | 0.0100          | <b>0.0267</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 10       | 0.520           | 5.00            | <b>33.7</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 10       | 0.0520          | 0.600           | <b>415</b>    | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 10       | 19.0            | 500             | <b>3500</b>   | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 11:00  
Analyzed: 09-Nov-2017 03:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 50       | 3.40            | 5.00            | <b>20.6</b> | ug/L  | D     |





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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 11:00  
Analyzed: 09-Nov-2017 03:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>4760</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 50       | 17.0            | 25.0            | <b>69.6</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 50       | 2.50            | 25.0            | <b>18.5</b> | ug/L  | J, D  |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 11:00  
Analyzed: 08-Nov-2017 14:00

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000630</b> | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 11:00  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>8420</b> | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 11:00  
Analyzed: 25-Oct-2017 14:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>7.84</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | ND     | mg-P/L | U     |



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Reported:  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/24/2017 11:00

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 2110   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | 480    | mg/L CaCO3 |       |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 2590   | mg/L CaCO3 |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 11:00  
Analyzed: 27-Oct-2017 03:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>3410</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10RE1 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 11:00  
Analyzed: 12-Nov-2017 14:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>117</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6E6-1-102417-(20)**  
**17J0453-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 11:00  
Analyzed: 27-Oct-2017 06:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>154</b> | mg/L  | D     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**GW-7E3-1-102417**  
**17J0453-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/24/2017 11:05  
Analyzed: 01-Nov-2017 23:11

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0031 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND              | ug/L          | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.14</b>     | ug/L          | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>1.97</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.91</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>117 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>93.5 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>86.4 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>105 %</i>  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417**  
**17J0453-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 11:05  
Analyzed: 08-Nov-2017 17:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 100      | 2.20            | 20.0            | <b>15600</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>2.00</b>  | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>5.45</b>  | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417**  
**17J0453-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 11:05  
Analyzed: 02-Nov-2017 14:45

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000130</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417**  
**17J0453-11RE1 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 11:05  
Analyzed: 08-Nov-2017 22:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 11:05  
Analyzed: 03-Nov-2017 19:29

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>59.8</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>1.14</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>15.8</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.327</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>35.2</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>36.7</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>2050</b>  | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 11:05  
Analyzed: 09-Nov-2017 03:14

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 100      | 2.20            | 20.0            | <b>14300</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 11:05  
Analyzed: 08-Nov-2017 14:02

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000160</b> | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 11:05  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 10 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 100             | <b>4820</b> | mg/L  |       |





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Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 11:05  
Analyzed: 25-Oct-2017 15:08

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.307</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.37</b> | mg-P/L |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/24/2017 11:05

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 825    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 825    | mg/L CaCO3 |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 11:05  
Analyzed: 11-Nov-2017 17:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>9.03</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 11:05  
Analyzed: 09-Nov-2017 04:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 11:05  
Analyzed: 09-Nov-2017 04:26

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte           | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper, Dissolved | 7440-50-8  | 10       | 3.40            | 5.00            | ND          | ug/L  | U     |
| Nickel, Dissolved | 7440-02-0  | 10       | 0.500           | 5.00            | <b>4.26</b> | ug/L  | J, D  |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 11:05  
Analyzed: 27-Oct-2017 03:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BfJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>2740</b> | mg/L  | D     |

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BfK0317 Sample Size: 5 mL  
Prepared: 10-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>5.47</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-7E3-1-102417-(20)**  
**17J0453-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 11:05  
Analyzed: 27-Oct-2017 07:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | <b>52.5</b> | mg/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-6B19-2-102417**  
**17J0453-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/24/2017 12:35  
Analyzed: 01-Nov-2017 23:31

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0031 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.63</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.06</b>     | ug/L          | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.46</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.82</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>118 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>94.8 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>83.5 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>105 %</i>  |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417**  
**17J0453-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 12:35  
Analyzed: 08-Nov-2017 21:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417**  
**17J0453-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 12:35  
Analyzed: 08-Nov-2017 21:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3000</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>1.83</b> | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>3.06</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417**  
**17J0453-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 12:35  
Analyzed: 02-Nov-2017 14:51

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Number: 79227  
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Reported:  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 12:35  
Analyzed: 03-Nov-2017 19:34

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 37.8   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 2.55   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 70.4   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 0.0868 | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 90.5   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 34.3   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | 2470   | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 12:35  
Analyzed: 13-Nov-2017 16:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 12:35  
Analyzed: 09-Nov-2017 03:34

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2710</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>2.03</b> | ug/L  | J, D  |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>3.65</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 12:35  
Analyzed: 08-Nov-2017 14:04

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 12:35  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 10 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 100             | <b>2760</b> | mg/L  |       |





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Olympia WA, 98503

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Reported:  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 12:35  
Analyzed: 25-Oct-2017 15:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.480</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>2.43</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.56</b> | mg-P/L |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/24/2017 12:35

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 558    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 558    | mg/L CaCO3 |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 12:35  
Analyzed: 11-Nov-2017 17:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>14.6</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 12:35  
Analyzed: 27-Oct-2017 04:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>3540</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 12:35  
Analyzed: 27-Oct-2017 07:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>28.6</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(20)**  
**17J0453-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 12:35  
Analyzed: 29-Oct-2017 08:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>1.81</b> | mg/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-6B19-2-102417-(01)**  
**17J0453-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/24/2017 12:40  
Analyzed: 01-Nov-2017 23:52

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0031 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.64</b> | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.05</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.44</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.86</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 120   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.4  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 86.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106   | %     |



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Olympia WA, 98503

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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(01)**  
**17J0453-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 12:40  
Analyzed: 08-Nov-2017 21:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |





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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(01)**  
**17J0453-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 12:40  
Analyzed: 08-Nov-2017 21:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2930</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>1.91</b> | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>3.02</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(01)**  
**17J0453-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 12:40  
Analyzed: 02-Nov-2017 14:53

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827  
Prepared: 30-Oct-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 12:40  
Analyzed: 03-Nov-2017 19:38

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>38.0</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>2.55</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>70.8</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0867</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>94.4</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>34.4</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>2460</b>   | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 12:40  
Analyzed: 13-Nov-2017 16:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 12:40  
Analyzed: 09-Nov-2017 03:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2650</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>2.85</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 12:40  
Analyzed: 08-Nov-2017 14:05

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 12:40  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 10 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 100             | <b>5660</b> | mg/L  |       |



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Reported:  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 12:40  
Analyzed: 25-Oct-2017 15:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.487</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>2.43</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.54</b> | mg-P/L |       |





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Reported:  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/24/2017 12:40

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 565    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 565    | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 12:40  
Analyzed: 11-Nov-2017 17:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>14.4</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 12:40  
Analyzed: 27-Oct-2017 04:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2500     | 250             | <b>3630</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 12:40  
Analyzed: 27-Oct-2017 07:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>28.1</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6B19-2-102417-(21)**  
**17J0453-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 12:40  
Analyzed: 29-Oct-2017 09:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>1.82</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417**  
**17J0453-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/24/2017 14:40  
Analyzed: 02-Nov-2017 00:12

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0031 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units       | Notes    |
|--|------------|----------|-----------------|-----------------|-----------------|-------------|----------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.59</b>     | ug/L        |          |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.05</b>     | ug/L        | J        |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.38</b>     | ug/L        |          |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.79</b>     | ug/L        |          |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>116</i>  | <i>%</i> |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>95.2</i> | <i>%</i> |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>86.6</i> | <i>%</i> |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>106</i>  | <i>%</i> |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417**  
**17J0453-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 14:40  
Analyzed: 08-Nov-2017 17:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>7.08</b> | ug/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417**  
**17J0453-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 14:40  
Analyzed: 07-Nov-2017 18:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Copper  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>105</b>  | ug/L  | D     |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>10.2</b> | ug/L  | D     |





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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417**  
**17J0453-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 14:40  
Analyzed: 02-Nov-2017 14:55

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFJ0827 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417**  
**17J0453-17RE1 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 14:40  
Analyzed: 08-Nov-2017 22:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 100      | 2.20            | 20.0            | <b>9450</b> | ug/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/24/2017 14:40  
Analyzed: 03-Nov-2017 19:43

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFJ0885  
Prepared: 31-Oct-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0611</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>2.04</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.932</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>0.0692</b> | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0060</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>37.3</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>63.8</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>1280</b>   | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/24/2017 14:40  
Analyzed: 09-Nov-2017 03:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 50       | 3.40            | 5.00            | <b>8.10</b> | ug/L  | D     |



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Reported:  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/24/2017 14:40  
Analyzed: 09-Nov-2017 03:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>10500</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 50       | 17.0            | 25.0            | <b>127</b>   | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 50       | 2.50            | 25.0            | <b>6.45</b>  | ug/L  | J, D  |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/24/2017 14:40  
Analyzed: 08-Nov-2017 14:07

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/24/2017 14:40  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>2880</b> | mg/L  |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 14:40  
Analyzed: 25-Oct-2017 16:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.597</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.20</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |





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Reported:  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/24/2017 14:40

Instrument: Accumet AR60

Analyzed: 25-Oct-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0752  
Prepared: 25-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 468    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 545    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1010   | mg/L CaCO3 |       |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/24/2017 14:40  
Analyzed: 11-Nov-2017 19:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>61.9</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 14:40  
Analyzed: 25-Oct-2017 19:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733  
Prepared: 25-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>4.46</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>4.91</b> | mg/L  | D     |



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**Reported:**  
14-Nov-2017 14:41

**GW-6D25-2-102417-(20)**  
**17J0453-18RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/24/2017 14:40  
Analyzed: 27-Oct-2017 04:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0733 Sample Size: 5 mL  
Prepared: 25-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1160</b> | mg/L  | D     |



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Reported:  
14-Nov-2017 14:41

**TB**  
**17J0453-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/24/2017 00:00  
Analyzed: 25-Oct-2017 13:37

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0736 Sample Size: 10 mL  
Prepared: 25-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--|------------|----------|-----------------|-----------------|--------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND     | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND     | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND     | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND     | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 | 80-129 %        | 88.7   | %     |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 | 80-120 %        | 97.7   | %     |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 | 80-120 %        | 93.6   | %     |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 | 80-120 %        | 100    | %     |       |



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Reported:  
14-Nov-2017 14:41

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0736 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0736-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 12:20 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.67            |                 | ug/L  | 5.00        |   | 93.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.91            |                 | ug/L  | 5.00        |   | 98.2 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.62            |                 | ug/L  | 5.00        |   | 92.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.83            |                 | ug/L  | 5.00        |   | 96.5 | 80-120      |      |           |       |
| <b>LCS (BFJ0736-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 09:29 |      |             |      |           |       |
| Vinyl Chloride                           | 10.2   | 0.06            | 0.20            | ug/L  | 10.0        |   | 102  | 66-133      |      |           |       |
| Chloroform                               | 9.42   | 0.03            | 0.20            | ug/L  | 10.0        |   | 94.2 | 80-122      |      |           |       |
| Trichloroethene                          | 9.71   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.1 | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.51            |                 | ug/L  | 5.00        |   | 90.2 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.48            |                 | ug/L  | 5.00        |   | 89.5 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.01            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.67            |                 | ug/L  | 5.00        |   | 93.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.86            |                 | ug/L  | 5.00        |   | 97.3 | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0736-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 09:55 |      |             |      |           |       |
| Vinyl Chloride                           | 10.3   | 0.06            | 0.20            | ug/L  | 10.0        |   | 103  | 66-133      | 0.59 | 30        |       |
| Chloroform                               | 9.78   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.8 | 80-122      | 3.76 | 30        |       |
| Trichloroethene                          | 9.54   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.4 | 80-120      | 1.80 | 30        |       |
| Tetrachloroethene                        | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      | 4.11 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.59            |                 | ug/L  | 5.00        |   | 91.7 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.62            |                 | ug/L  | 5.00        |   | 92.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.95            |                 | ug/L  | 5.00        |   | 98.9 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.78            |                 | ug/L  | 5.00        |   | 95.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.80            |                 | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0769 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PAB

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0769-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 12:19 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | 0.06   | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.70            |                 | ug/L  | 5.00        |   | 94.0 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.94            |                 | ug/L  | 5.00        |   | 98.8 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.56            |                 | ug/L  | 5.00        |   | 91.1 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.98            |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| <b>LCS (BFJ0769-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 10:04 |      |             |      |           |       |
| Vinyl Chloride                           | 10.0   | 0.06            | 0.20            | ug/L  | 10.0        |   | 100  | 66-133      |      |           |       |
| Chloroform                               | 9.65   | 0.03            | 0.20            | ug/L  | 10.0        |   | 96.5 | 80-122      |      |           |       |
| Trichloroethene                          | 9.67   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.7 | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |   | 103  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.52            |                 | ug/L  | 5.00        |   | 90.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.53            |                 | ug/L  | 5.00        |   | 90.6 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.85            |                 | ug/L  | 5.00        |   | 97.0 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.72            |                 | ug/L  | 5.00        |   | 94.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.92            |                 | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0769-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 10:38 |      |             |      |           |       |
| Vinyl Chloride                           | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      | 0.07 | 30        |       |
| Chloroform                               | 9.27   | 0.03            | 0.20            | ug/L  | 10.0        |   | 92.7 | 80-122      | 4.01 | 30        |       |
| Trichloroethene                          | 9.64   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.4 | 80-120      | 0.33 | 30        |       |
| Tetrachloroethene                        | 10.5   | 0.05            | 0.20            | ug/L  | 10.0        |   | 105  | 80-120      | 1.74 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.58            |                 | ug/L  | 5.00        |   | 91.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.43            |                 | ug/L  | 5.00        |   | 88.5 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.97            |                 | ug/L  | 5.00        |   | 99.5 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.80            |                 | ug/L  | 5.00        |   | 96.1 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.86            |                 | ug/L  | 5.00        |   | 97.3 | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

### Volatile Organic Compounds - Quality Control

#### Batch BFK0031 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: LH

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result         | %REC                        | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|-----------------------|-----------------------------|-------------|------|-----------|-------|
| <b>Blank (BFK0031-BLK1)</b>              |        |                 |                 |       |             |                       |                             |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 | Analyzed: 01-Nov-2017 19:42 |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |                       |                             |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |                       |                             |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |                       |                             |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |                       |                             |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.40            |                 | ug/L  | 5.00        |                       | 108                         | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.77            |                 | ug/L  | 5.00        |                       | 95.4                        | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.38            |                 | ug/L  | 5.00        |                       | 87.6                        | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.30            |                 | ug/L  | 5.00        |                       | 106                         | 80-120      |      |           |       |
| <b>LCS (BFK0031-BS1)</b>                 |        |                 |                 |       |             |                       |                             |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 | Analyzed: 01-Nov-2017 18:21 |             |      |           |       |
| Vinyl Chloride                           | 10.2   | 0.06            | 0.20            | ug/L  | 10.0        |                       | 102                         | 66-133      |      |           |       |
| Chloroform                               | 11.0   | 0.03            | 0.20            | ug/L  | 10.0        |                       | 110                         | 80-122      |      |           |       |
| Trichloroethene                          | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |                       | 102                         | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |                       | 103                         | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.04            |                 | ug/L  | 5.00        |                       | 101                         | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.08            |                 | ug/L  | 5.00        |                       | 102                         | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.14            |                 | ug/L  | 5.00        |                       | 103                         | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.02            |                 | ug/L  | 5.00        |                       | 100                         | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.94            |                 | ug/L  | 5.00        |                       | 98.9                        | 80-120      |      |           |       |
| <b>LCS Dup (BFK0031-BSD1)</b>            |        |                 |                 |       |             |                       |                             |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 | Analyzed: 01-Nov-2017 18:41 |             |      |           |       |
| Vinyl Chloride                           | 10.8   | 0.06            | 0.20            | ug/L  | 10.0        |                       | 108                         | 66-133      | 5.75 | 30        |       |
| Chloroform                               | 10.8   | 0.03            | 0.20            | ug/L  | 10.0        |                       | 108                         | 80-122      | 1.52 | 30        |       |
| Trichloroethene                          | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |                       | 103                         | 80-120      | 1.88 | 30        |       |
| Tetrachloroethene                        | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |                       | 101                         | 80-120      | 1.73 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.04            |                 | ug/L  | 5.00        |                       | 101                         | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.03            |                 | ug/L  | 5.00        |                       | 101                         | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.14            |                 | ug/L  | 5.00        |                       | 103                         | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.87            |                 | ug/L  | 5.00        |                       | 97.5                        | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.02            |                 | ug/L  | 5.00        |                       | 100                         | 80-120      |      |           |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

### Volatile Organic Compounds - Quality Control

#### Batch BFK0042 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0042-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 09:24 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.79            |                 | ug/L  | 5.00        |   | 95.7 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.47            |                 | ug/L  | 5.00        |   | 89.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.12            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFK0042-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 08:03 |      |             |      |           |       |
| Vinyl Chloride                           | 10.4   | 0.06            | 0.20            | ug/L  | 10.0        |   | 104  | 66-133      |      |           |       |
| Chloroform                               | 9.77   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.7 | 80-122      |      |           |       |
| Trichloroethene                          | 9.80   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.0 | 80-120      |      |           |       |
| Tetrachloroethene                        | 9.61   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.1 | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.95            |                 | ug/L  | 5.00        |   | 99.0 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.62            |                 | ug/L  | 5.00        |   | 92.5 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.92            |                 | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.92            |                 | ug/L  | 5.00        |   | 98.3 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0042-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 08:44 |      |             |      |           |       |
| Vinyl Chloride                           | 10.6   | 0.06            | 0.20            | ug/L  | 10.0        |   | 106  | 66-133      | 1.67 | 30        |       |
| Chloroform                               | 10.5   | 0.03            | 0.20            | ug/L  | 10.0        |   | 105  | 80-122      | 6.96 | 30        |       |
| Trichloroethene                          | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      | 3.03 | 30        |       |
| Tetrachloroethene                        | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      | 5.61 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.80            |                 | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.56            |                 | ug/L  | 5.00        |   | 91.1 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.07            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.88            |                 | ug/L  | 5.00        |   | 97.6 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.90            |                 | ug/L  | 5.00        |   | 98.1 | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0827 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0827-BLK1)</b> |         |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 02-Nov-2017 14:08 |      |             |     |           |       |
| Mercury                     | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0827-BS1)</b>    |         |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 02-Nov-2017 14:10 |      |             |     |           |       |
| Mercury                     | 0.00236 | 0.000100        | mg/L  | 0.00200     |   | 118  | 80-120      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0004 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC Limits | RPD    | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|-------------|--------|-----------|-------|
| <b>Blank (BFK0004-BLK1)</b>       |         |        |                 |                 |       | Prepared: 01-Nov-2017 Analyzed: 07-Nov-2017 18:05                    |               |             |        |           |       |
| Lead                              | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |             |        |           | U     |
| Arsenic                           | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |             |        |           | U     |
| Copper                            | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |             |        |           | U     |
| Copper                            | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |             |        |           | U     |
| Nickel                            | 60      | 0.0800 | 0.0500          | 0.500           | ug/L  |  |               |             |        |           | J     |
| Nickel                            | 62      | ND     | 0.220           | 0.500           | ug/L  |  |               |             |        |           | U     |
| <b>Blank (BFK0004-BLK2)</b>       |         |        |                 |                 |       | Prepared: 01-Nov-2017 Analyzed: 08-Nov-2017 16:02                    |               |             |        |           |       |
| Lead                              | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |             |        |           | U     |
| Arsenic                           | 75a     | 0.0250 | 0.0220          | 0.200           | ug/L  |  |               |             |        |           | J     |
| <b>LCS (BFK0004-BS1)</b>          |         |        |                 |                 |       | Prepared: 01-Nov-2017 Analyzed: 07-Nov-2017 18:55                    |               |             |        |           |       |
| Lead                              | 208     | 24.3   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 97.4        | 80-120 |           |       |
| Arsenic                           | 75a     | 24.4   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 97.6        | 80-120 |           |       |
| Copper                            | 63      | 26.4   | 0.340           | 0.500           | ug/L  | 25.0   |               | 106         | 80-120 |           |       |
| Copper                            | 65      | 26.6   | 0.350           | 0.500           | ug/L  | 25.0   |               | 106         | 80-120 |           |       |
| Nickel                            | 60      | 25.3   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 101         | 80-120 |           |       |
| Nickel                            | 62      | 25.6   | 0.220           | 0.500           | ug/L  | 25.0   |               | 102         | 80-120 |           |       |
| <b>LCS (BFK0004-BS2)</b>          |         |        |                 |                 |       | Prepared: 01-Nov-2017 Analyzed: 08-Nov-2017 16:33                    |               |             |        |           |       |
| Lead                              | 208     | 28.1   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 112         | 80-120 |           |       |
| Arsenic                           | 75a     | 24.9   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 99.7        | 80-120 |           |       |
| <b>Duplicate (BFK0004-DUP1)</b>   |         |        |                 |                 |       | Source: 17J0453-05 Prepared: 01-Nov-2017 Analyzed: 08-Nov-2017 21:58 |               |             |        |           |       |
| Arsenic                           | 75a     | 2520   | 0.440           | 4.00            | ug/L  |  | 2550          |             | 1.02   | 20        | D     |
| <b>Duplicate (BFK0004-DUP2)</b>   |         |        |                 |                 |       | Source: 17J0453-05 Prepared: 01-Nov-2017 Analyzed: 08-Nov-2017 22:49 |               |             |        |           |       |
| Lead                              | 208     | ND     | 0.136           | 0.200           | ug/L  |  | ND            |             |        |           | U     |
| Copper                            | 63      | 2.99   | 0.680           | 1.00            | ug/L  |  | 3.14          |             |        |           | D     |
| Nickel                            | 60      | 4.63   | 0.100           | 1.00            | ug/L  |  | 2.84          |             | 47.80  | 20        | *, D  |
| <b>Matrix Spike (BFK0004-MS1)</b> |         |        |                 |                 |       | Source: 17J0453-05 Prepared: 01-Nov-2017 Analyzed: 08-Nov-2017 22:08 |               |             |        |           |       |
| Arsenic                           | 75a     | 2570   | 0.440           | 4.00            | ug/L  | 25.0   | 2550          | 95.0        | 75-125 |           | D     |
| <b>Matrix Spike (BFK0004-MS2)</b> |         |        |                 |                 |       | Source: 17J0453-05 Prepared: 01-Nov-2017 Analyzed: 08-Nov-2017 22:58 |               |             |        |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0004 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result                    | Detection Limit | Reporting Limit | Units                 | Spike Level | Source Result               | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-----------------|-----------------|-----------------------|-------------|-----------------------------|------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFK0004-MS2)</b> |         | <b>Source: 17J0453-05</b> |                 |                 | Prepared: 01-Nov-2017 |             | Analyzed: 08-Nov-2017 22:58 |      |             |     |           |       |
| Lead                              | 208     | 26.0                      | 0.136           | 0.200           | ug/L                  | 25.0        | ND                          | 104  | 75-125      |     |           | D     |
| Copper                            | 63      | 28.5                      | 0.680           | 1.00            | ug/L                  | 25.0        | 3.14                        | 101  | 75-125      |     |           | D     |
| Nickel                            | 60      | 29.7                      | 0.100           | 1.00            | ug/L                  | 25.0        | 2.84                        | 107  | 75-125      |     |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFJ0885 - WMN (No Prep)**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0885-BLK1)</b> |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 31-Oct-2017 Analyzed: 03-Nov-2017 17:05 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Arsenic, Dissolved          | ND     | 0.0047          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0101 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.288  | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFJ0885-BS1)</b> |       |        |        |      |       |   |      |        |  |  |   |
|                          |       |        |        |      |       | Prepared: 31-Oct-2017 Analyzed: 03-Nov-2017 17:25 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.08  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 104  | 80-120 |  |  |   |
| Arsenic, Dissolved       | 2.04  | 0.0047 | 0.0500 | mg/L | 2.00  |   | 102  | 80-120 |  |  |   |
| Calcium, Dissolved       | 9.79  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 97.9 | 80-120 |  |  |   |
| Iron, Dissolved          | 2.07  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 104  | 80-120 |  |  |   |
| Magnesium, Dissolved     | 10.7  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 107  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.504 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 101  | 80-120 |  |  |   |
| Potassium, Dissolved     | 9.34  | 0.0520 | 0.500  | mg/L | 10.0  |   | 93.4 | 80-120 |  |  |   |
| Silicon, Dissolved       | 10.5  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 105  | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.37  | 0.0114 | 0.500  | mg/L | 10.0  |   | 93.7 | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.7  | 1.90   | 50.0   | mg/L | 10.0  |   | 107  | 80-120 |  |  | J |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0040 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0040-BLK1)</b>       |         | Prepared: 02-Nov-2017 Analyzed: 08-Nov-2017 13:43 |       |   |               |      |             |     |           |       |
| Mercury, Dissolved                | ND      | 0.000100  | mg/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0040-BS1)</b>          |         | Prepared: 02-Nov-2017 Analyzed: 08-Nov-2017 13:45 |       |   |               |      |             |     |           |       |
| Mercury, Dissolved                | 0.00227 | 0.000100  | mg/L  | 0.00200   |               | 114  | 80-120      |     |           |       |
| <b>Duplicate (BFK0040-DUP1)</b>   |         | <b>Source: 17J0453-06</b>                         |       | Prepared: 02-Nov-2017 Analyzed: 08-Nov-2017 13:51 |               |      |             |     |           |       |
| Mercury, Dissolved                | ND      | 0.000100  | mg/L  |   | ND            |      |             |     |           | L, U  |
| <b>Matrix Spike (BFK0040-MS1)</b> |         | <b>Source: 17J0453-06</b>                         |       | Prepared: 02-Nov-2017 Analyzed: 08-Nov-2017 13:53 |               |      |             |     |           |       |
| Mercury, Dissolved                | 0.00112 | 0.000100  | mg/L  | 0.00100   | ND            | 108  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0071 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0071-BLK1)</b> |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 04:04 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic, Dissolved          | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0071-BS1)</b>    |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 04:57 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | 29.7   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 119  | 80-120      |     |           |       |
| Arsenic, Dissolved          | 75a     | 25.3   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 101  | 80-120      |     |           |       |
| Copper, Dissolved           | 63      | 28.6   | 0.340           | 0.500           | ug/L  | 25.0  |               | 114  | 80-120      |     |           |       |
| Copper, Dissolved           | 65      | 27.6   | 0.350           | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Nickel, Dissolved           | 60      | 27.8   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Nickel, Dissolved           | 62      | 27.8   | 0.220           | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

Wet Chemistry - Quality Control

Batch BFJ0733 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0733-BLK1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:25                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| <b>LCS (BFJ0733-BS1)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 11:45                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.49   | 0.100           | mg/L   | 1.50        |               | 99.0 | 90-110      |      |           |       |
| Chloride  | 1.50   | 0.100           | mg/L   | 1.50        |               | 99.9 | 90-110      |      |           |       |
| Fluoride  | 1.53   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| Nitrate-N   | 1.54   | 0.100           | mg-N/L | 1.50        |               | 103  | 90-110      |      |           |       |
| Nitrite-N   | 1.53   | 0.100           | mg-N/L | 1.50        |               | 102  | 90-110      |      |           |       |
| Orthophosphorus   | 1.49   | 0.10            | mg-P/L | 1.50        |               | 99.3 | 90-110      |      |           |       |
| Sulfate   | 1.53   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0733-DUP1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0453-02 Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 12:25    |        |                 |        |             |               |      |             |      |           |       |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| <b>Duplicate (BFJ0733-DUP2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0453-02RE1 Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 18:22 |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 9.30   | 0.500           | mg/L   |             | 9.16          |      |             | 1.53 | 20        | D     |
| Fluoride  | 0.753  | 0.500           | mg/L   |             | 0.734         |      |             | 2.56 | 20        | D     |
| Orthophosphorus   | 3.93   | 0.50            | mg-P/L |             | 3.90          |      |             | 0.74 | 20        | D     |
| Sulfate   | 9.24   | 0.500           | mg/L   |             | 9.41          |      |             | 1.86 | 20        | D     |
| <b>Duplicate (BFJ0733-DUP3)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0453-02RE2 Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 01:51 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 2700   | 200             | mg/L   |             | 2910          |      |             | 7.46 | 20        | D     |
| <b>Duplicate (BFJ0733-DUP4)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0453-02RE2 Prepared: 25-Oct-2017 Analyzed: 27-Oct-2017 02:11 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 2860   | 200             | mg/L   |             | 2910          |      |             | 1.61 | 20        | D     |
| <b>Matrix Spike (BFJ0733-MS1)</b>                                       |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0453-02 Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 12:45    |        |                 |        |             |               |      |             |      |           |       |
| Nitrate-N   | 2.23   | 0.100           | mg-N/L | 2.00        | ND            | 111  | 75-125      |      |           |       |
| Nitrite-N   | 1.74   | 0.100           | mg-N/L | 2.00        | ND            | 87.0 | 75-125      |      |           |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**Wet Chemistry - Quality Control**

**Batch BFJ0733 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

| <b>Matrix Spike (BFJ0733-MS2)</b> | <b>Source: 17J0453-02RE1</b> |      | Prepared: 25-Oct-2017 |      | Analyzed: 25-Oct-2017 18:42 |      |        |  |  |   |
|-----------------------------------|------------------------------|------|-----------------------|------|-----------------------------|------|--------|--|--|---|
| Bromide                           | 12.6                         | 1.00 | mg/L                  | 4.00 | 9.16                        | 85.2 | 75-125 |  |  | D |
| Fluoride                          | 3.87                         | 1.00 | mg/L                  | 4.00 | 0.734                       | 96.6 | 75-125 |  |  | D |
| Orthophosphorus                   | 7.74                         | 1.00 | mg-P/L                | 4.00 | 3.90                        | 96.2 | 75-125 |  |  | D |
| Sulfate                           | 12.5                         | 1.00 | mg/L                  | 4.00 | 9.41                        | 76.8 | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**Wet Chemistry - Quality Control**

**Batch BFJ0752 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit | Units      | Spike Level | Source Result | %REC  | %REC Limits  | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|------------|-------------|---------------|---|--------------|-----|-----------|-------|
| <b>Blank (BFJ0752-BLK1)</b>     |        |                 |            |             |               | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 15:31 |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00            | mg/L CaCO3 |             |               |   |              |     |           | U     |
| <b>Blank (BFJ0752-BLK2)</b>     |        |                 |            |             |               | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 17:45 |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00            | mg/L CaCO3 |             |               |   |              |     |           | U     |
| <b>Reference (BFJ0752-SRM1)</b> |        |                 |            |             |               | Prepared: 25-Oct-2017 Analyzed: 25-Oct-2017 15:31 |              |     |           |       |
| Alkalinity, Total               | 101    | 1.00            | mg/L CaCO3 | 108         |               | 93.9  | 90.37-108.33 |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**Wet Chemistry - Quality Control**

**Batch BFJ0849 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0849-BLK1)</b> |        |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 13:02 |      |             |     |           |       |
| Dissolved Solids            | ND     | 5.0             | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0849-BS1)</b>    |        |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 13:02 |      |             |     |           |       |
| Dissolved Solids            | 503    | 5.0             | mg/L  | 500         |   | 101  | 90-110      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
14-Nov-2017 14:41

**Wet Chemistry - Quality Control**

**Batch BFK0217 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: GM

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0217-BLK1)</b>         |        |                 |       |             | Prepared: 08-Nov-2017 Analyzed: 09-Nov-2017 17:20 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
14-Nov-2017 14:41

### Wet Chemistry - Quality Control

#### Batch BFK0317 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit              | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|------------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0317-BLK1)</b>       |        |                              |       |             |   |      |             |      |           |       |
|                                   |        |                              |       |             | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 02:35 |      |             |      |           |       |
| Fluoride                          | ND     | 0.100                        | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFK0317-BS1)</b>          |        |                              |       |             |   |      |             |      |           |       |
|                                   |        |                              |       |             | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 02:54 |      |             |      |           |       |
| Fluoride                          | 1.54   | 0.100                        | mg/L  | 1.50        |   | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFK0317-DUP1)</b>   |        |                              |       |             |   |      |             |      |           |       |
|                                   |        | <b>Source: 17J0453-12RE1</b> |       |             | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 03:34 |      |             |      |           |       |
| Fluoride                          | 5.48   | 0.200                        | mg/L  |             | 5.47  |      |             | 0.24 | 20        | D     |
| <b>Matrix Spike (BFK0317-MS1)</b> |        |                              |       |             |   |      |             |      |           |       |
|                                   |        | <b>Source: 17J0453-12RE1</b> |       |             | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 03:54 |      |             |      |           |       |
| Fluoride                          | 13.3   | 0.500                        | mg/L  | 10.0        | 5.47  | 78.3 | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Reported:  
14-Nov-2017 14:41

### Certified Analyses included in this Report

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Arsenic                           | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
14-Nov-2017 14:41

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Chloromethane                         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
14-Nov-2017 14:41

|                             |                                 |
|-----------------------------|---------------------------------|
| Dibromochloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |





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**Reported:**  
14-Nov-2017 14:41

Alkalinity, Total

DoD-ELAP,WADOE,WA-DW,NELAP

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
14-Nov-2017 14:41

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



22 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0479

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17J0479**  
 Turn-around Requested: **Normal**  
 ARI Client Company: **Pioneer Technologies**  
 Phone: **360-570-1700**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kerner / D Pickering**

Date: **10.25.17**  
 Page: **1** of **2**  
 No. of Coolers: **1**  
 Cooler Temps: **2**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID  | Date  | Time | Matrix | No. Containers | Analysis Requested   |  |  |   |  |  |                                   | Notes/Comments |                         |   |
|--|---|------|--------|----------------|--|--|--|---|--|--|-----------------------------------|----------------|-------------------------|---|
|  |   |      |        |                | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A   | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0   | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 |                | Dissolved DOC SM 5310 B | Total Alkalinity                            |
| GW-0613-2-102517   | 10.25.17  | 840  | water  | 4              | X  | X  | X  | X   | X  | X  | X                                 | X              | Total Alkalinity        | All dissolved samples field filtered 0.45uM |
| GW-0613-2-102517-(20)  |   | 840  |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         | Total Alkalinity                            |
| GW-0611-1-102517   |   | 835  |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| GW-0611-1-102517-(20)  |   | 835  |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| GW-7E3-2R-102517   |   | 1015 |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| GW-7E3-2R-102517-(20)  |   | 1015 |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| GW-0614-1-102517   |   | 1025 |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| GW-0614-1-102517-(20)  |   | 1025 |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| GW-0611-1-102517   |   | 1120 |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| GW-0611-1-102517-(20)  |   | 1120 |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| GW-0619-2-102517   |   | 1130 |        |                | X  | X  | X  | X   | X  | X  | X                                 | X              |                         |   |
| Comments/Special Instructions  | Relinquished by: (Signature) <i>[Signature]</i><br>Printed Name: <b>Luke Kerner</b><br>Company: <b>DOP</b><br>Date & Time: <b>10/25/17 1545</b> |      |        |                | Received by: (Signature) <i>[Signature]</i><br>Printed Name: <b>Brandon Fisk</b><br>Company: <b>ARI</b><br>Date & Time: <b>10/25/17 1545</b> |  |  |   | Relinquished by: (Signature) <i>[Signature]</i><br>Printed Name: <b>Brandon Fisk</b><br>Company: <b>ARI</b><br>Date & Time: <b>10/25/17 1545</b> |  |                                   |                |                         |   |
| Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 |   |      |        |                |  |  |  |   |  |  |                                   |                |                         |   |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17J0479**  
 Turn-around Requested: **Normal**  
 ARI Client Company: **Pioneer Technologies**  
 Phone: **360-570-1700**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Keimer / D Pickering**

Date: **10.25.17**  
 Page: **2** of **2**  
 No. of Coolers: **2**  
 Cooler Temps:

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID                     | Date  | Time   | Matrix   | No. Containers | Analysis Requested                       |  |  |   |  |  |                                   |                         | Notes/Comments |   |
|-------------------------------|---|--|--|----------------|--|--|--|---|--|--|-----------------------------------|-------------------------|----------------|---|
|                               |   |  |  |                | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0 | Carbonate and Bicarbonate as Alkalinity EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B |                |   |
| GW-609-2-102517-(20)          | 10.25.17  | 1130   | Water  | 4              | X  | X  | X  | X   | X  | X  | X                                 | X                       | X              | All dissolved samples field filtered 0.45uM |
| GW-502-1R-102517              |   | 1235   |  |                | X  |  | X  |   |  |  |                                   |                         |                |   |
| GW-502-1R-102517-(20)         |   | 1235   |  |                | X  |  | X  |   |  |  |                                   |                         |                |   |
| GW-6025-1-102517              |   | 1240   |  |                | X  |  | X  |   |  |  |                                   |                         |                |   |
| GW-6025-1-102517-(20)         |   | 1240   |  |                | X  |  | X  |   |  |  |                                   |                         |                |   |
| GW-7E7-2-102517               |   | 1415   |  |                | X  |  | X  |   |  |  |                                   |                         |                |   |
| GW-7E7-2-102517-(20)          |   | 1415   |  |                | X  |  | X  |   |  |  |                                   |                         |                |   |
| GW-8F1-1R-102517              |   | 1420   |  |                | X  |  | X  |   |  |  |                                   |                         |                |   |
| GW-8F1-1R-102517-(20)         |   | 1420   |  |                | X  |  | X  |   |  |  |                                   |                         |                |   |
| Comments/Special Instructions | Relinquished by (Signature): <i>[Signature]</i><br>Printed Name: <b>Luke Herr</b><br>Company: <b>ARI</b><br>Date & Time: <b>10-25-17 1545</b> | Relinquished by (Signature): <i>[Signature]</i><br>Printed Name: <b>Brandon Fisk</b><br>Company: <b>ARI</b><br>Date & Time: <b>10/25/17 1545</b> | Received by (Signature): <i>[Signature]</i><br>Printed Name:<br>Company:<br>Date & Time: |                |  |  |  |   |  |  |                                   |                         |                |   |

**Limit of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





WORK ORDER

17J0479

Client: Pioneer Technologies Corporation

Project Manager: Amanda Volgardsen

Project: Port of Tacoma Arkema- FS Data Gap Investigatio

Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                    | pH  |      |
|--------------|-----------------------------------|-----|------|
| 17J0479-01 A | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-01 B | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-01 C | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-01 D | HDPE NM, 500 mL, 1:1 HNO3         | 7.2 | fail |
| 17J0479-01 E | Small OJ, 500 mL                  |     |      |
| 17J0479-02 A | Glass NM, Amber, 250 mL, 9N H2SO4 | 2.7 | pass |
| 17J0479-02 B | Small OJ, 500 mL                  |     |      |
| 17J0479-02 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | 7.2 | fail |
| 17J0479-02 D | Large OJ, 1000 mL                 |     |      |
| 17J0479-03 A | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-03 B | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-03 C | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-03 D | HDPE NM, 500 mL, 1:1 HNO3         | 7.2 | pass |
| 17J0479-04 A | Glass NM, Amber, 250 mL, 9N H2SO4 | 7.2 | pass |
| 17J0479-04 B | Small OJ, 500 mL                  |     |      |
| 17J0479-04 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | 7.2 | pass |
| 17J0479-04 D | Large OJ, 1000 mL                 |     |      |
| 17J0479-05 A | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-05 B | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-05 C | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-05 D | HDPE NM, 500 mL, 1:1 HNO3         | 7.2 | pass |
| 17J0479-06 A | Glass NM, Amber, 250 mL, 9N H2SO4 | 7.2 | pass |
| 17J0479-06 B | Small OJ, 500 mL                  |     |      |
| 17J0479-06 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | 7.2 | fail |
| 17J0479-06 D | Large OJ, 1000 mL                 |     |      |
| 17J0479-07 A | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-07 B | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-07 C | VOA Vial, Clear, 40 mL, HCL       |     |      |
| 17J0479-07 D | HDPE NM, 500 mL, 1:1 HNO3         | 7.2 | pass |
| 17J0479-08 A | Glass NM, Amber, 250 mL, 9N H2SO4 | 7.2 | pass |
| 17J0479-08 B | Small OJ, 500 mL                  |     |      |



WORK ORDER

17J0479

| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |                     |
|--|-----------------------------------|--|---------------------|
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |                     |
| 17J0479-08 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2   | pass                |
| 17J0479-08 D   | Large OJ, 1000 mL                 |  |                     |
| 17J0479-09 A   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-09 B   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-09 C   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-09 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2   | pass                |
| 17J0479-10 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2   | pass                |
| 17J0479-10 B   | Small OJ, 500 mL                  |  |                     |
| 17J0479-10 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2   | pass                |
| 17J0479-10 D   | Large OJ, 1000 mL                 |  |                     |
| 17J0479-11 A   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-11 B   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-11 C   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-11 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2   | fail                |
| 17J0479-12 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2   | pass                |
| 17J0479-12 B   | Small OJ, 500 mL                  |  |                     |
| 17J0479-12 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2   | fail                |
| 17J0479-12 D   | Large OJ, 1000 mL                 |  |                     |
| 17J0479-13 A   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-13 B   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-13 C   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-13 D   | HDPE NM, 500 mL, 1:1 HNO3         | >2   | fail                |
| 17J0479-14 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2 pass  | >2 fail BF 10/25/17 |
| 17J0479-14 B   | Small OJ, 500 mL                  |  |                     |
| 17J0479-14 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | >2   | fail                |
| 17J0479-14 D   | Large OJ, 1000 mL                 |  |                     |
| 17J0479-15 A   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-15 B   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-15 C   | VOA Vial, Clear, 40 mL, HCL       |  |                     |
| 17J0479-15 D   | HDPE NM, 500 mL, 1:1 HNO3         | <2   | pass                |
| 17J0479-16 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | <2   | pass                |
| 17J0479-16 B   | Small OJ, 500 mL                  |  |                     |
| 17J0479-16 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | <2   | pass                |
| 17J0479-16 D   | Large OJ, 1000 mL                 |  |                     |





WORK ORDER

17J0479

|  |                                   |  |      |
|--|-----------------------------------|--|------|
| Client: Pioneer Technologies Corporation                 |                                   | Project Manager: Amanda Volgardsen                         |      |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                   | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |      |
| 17J0479-17 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0479-17 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0479-17 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0479-17 D   | HDPE NM, 500 mL, 1:1 HNO3         | < 2  | pass |
| 17J0479-18 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2  | pass |
| 17J0479-18 B   | Small OJ, 500 mL                  |  |      |
| 17J0479-18 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2  | fail |
| 17J0479-18 D   | Large OJ, 1000 mL                 | BF   |      |
| 17J0479-19 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0479-19 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0479-19 C   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0479-19 D   | HDPE NM, 500 mL, 1:1 HNO3         | > 2  | fail |
| 17J0479-20 A   | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2  | pass |
| 17J0479-20 B   | Small OJ, 500 mL                  |  |      |
| 17J0479-20 C   | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | > 2  | fail |
| 17J0479-20 D   | Large OJ, 1000 mL                 |  |      |
| 17J0479-21 A   | VOA Vial, Clear, 40 mL, HCL       |  |      |
| 17J0479-21 B   | VOA Vial, Clear, 40 mL, HCL       |  |      |

BF  
Preservation Confirmed By

10/26/17  
Date





# Cooler Receipt Form

ARI Client: DOF

Project Name: \_\_\_\_\_

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 1750479

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO   
 Were custody papers included with the cooler? ..... YES  NO   
 Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time: 5.9 5.1

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 2005206

Cooler Accepted by: BIF Date: 10/25/17 Time: 1545

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO   
 What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? ..... NA YES  NO   
 Were all bottles sealed in individual plastic bags? ..... YES  NO   
 Did all bottles arrive in good condition (unbroken)? ..... YES  NO   
 Were all bottle labels complete and legible? ..... YES  NO   
 Did the number of containers listed on COC match with the number of containers received? ..... YES  NO   
 Did all bottle labels and tags agree with custody papers? ..... YES  NO   
 Were all bottles used correct for the requested analyses? ..... YES  NO   
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO   
 Were all VOC vials free of air bubbles? ..... NA YES  NO   
 Was sufficient amount of sample sent in each bottle? ..... YES  NO   
 Date VOC Trip Blank was made at ARI ..... NA   
 Was Sample Split by ARI :  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: BIF Date: 10/26/17 Time: 907

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle          | Sample ID on COC             | Sample ID on Bottle | Sample ID on COC |
|------------------------------|------------------------------|---------------------|------------------|
| <u>GW-7E3-2R-102517</u>      | <u>GW-7E3-2R-102517</u>      |                     |                  |
| <u>GW-7E3-2R-102517-(20)</u> | <u>GW-7E3-2R-102517-(20)</u> |                     |                  |
|                              |                              |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**  
TBs not on COC  
air bubbles  
6E9-2 - all 3 vials have pb  
7E3-2R-1 had lots of sm, 1 had lots of sm + 1 pb  
6E9-2 - all 3 had hs  
6D25-1 - 1 had a sm  
7E7-2 - all had a lg  
BFI-1R - 1 had a pb  
TB - 1 had a pb

By: \_\_\_\_\_ Date: \_\_\_\_\_

|                                   |                             |                                    |
|-----------------------------------|-----------------------------|------------------------------------|
| <b>Small Air Bubbles</b><br>- 2mm | <b>Peabubbles</b><br>2-4 mm | <b>LARGE Air Bubbles</b><br>> 4 mm |
|                                   |                             |                                    |

Small → "sm" (< 2 mm)  
 Peabubbles → "pb" (2 to < 4 mm)  
 Large → "lg" (4 to < 6 mm)  
 Headspace → "hs" (> 6 mm)



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID              | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|------------------------|---------------|--------|-------------------|-------------------|
| GW-6G3-2-102517        | 17J0479-01    | Water  | 25-Oct-2017 08:40 | 25-Oct-2017 15:45 |
| GW-6G3-2-102517-(20)   | 17J0479-02    | Water  | 25-Oct-2017 08:40 | 25-Oct-2017 15:45 |
| GW-6H1-1-102517        | 17J0479-03    | Water  | 25-Oct-2017 08:35 | 25-Oct-2017 15:45 |
| GW-6H1-1-102517-(20)   | 17J0479-04    | Water  | 25-Oct-2017 08:35 | 25-Oct-2017 15:45 |
| GW-7E13-2R-102517      | 17J0479-05    | Water  | 25-Oct-2017 10:15 | 25-Oct-2017 15:45 |
| GW-7E13-2R-102517-(20) | 17J0479-06    | Water  | 25-Oct-2017 10:15 | 25-Oct-2017 15:45 |
| GW-6D14-1-102517       | 17J0479-07    | Water  | 25-Oct-2017 10:25 | 25-Oct-2017 15:45 |
| GW-6D14-1-102517-(20)  | 17J0479-08    | Water  | 25-Oct-2017 10:25 | 25-Oct-2017 15:45 |
| GW-6E1-1-102517        | 17J0479-09    | Water  | 25-Oct-2017 11:20 | 25-Oct-2017 15:45 |
| GW-6E1-1-102517-(20)   | 17J0479-10    | Water  | 25-Oct-2017 11:20 | 25-Oct-2017 15:45 |
| GW-6E9-2-102517        | 17J0479-11    | Water  | 25-Oct-2017 11:30 | 25-Oct-2017 15:45 |
| GW-6E9-2-102517-(20)   | 17J0479-12    | Water  | 25-Oct-2017 11:30 | 25-Oct-2017 15:45 |
| GW-5D2-1R-102517       | 17J0479-13    | Water  | 25-Oct-2017 12:35 | 25-Oct-2017 15:45 |
| GW-5D2-1R-102517-(20)  | 17J0479-14    | Water  | 25-Oct-2017 12:35 | 25-Oct-2017 15:45 |
| GW-6D25-1-102517       | 17J0479-15    | Water  | 25-Oct-2017 12:40 | 25-Oct-2017 15:45 |
| GW-6D25-1-102517-(20)  | 17J0479-16    | Water  | 25-Oct-2017 12:40 | 25-Oct-2017 15:45 |
| GW-7E7-2-102517        | 17J0479-17    | Water  | 25-Oct-2017 14:15 | 25-Oct-2017 15:45 |
| GW-7E7-2-102517-(20)   | 17J0479-18    | Water  | 25-Oct-2017 14:15 | 25-Oct-2017 15:45 |
| GW-8F1-1R-102517       | 17J0479-19    | Water  | 25-Oct-2017 14:20 | 25-Oct-2017 15:45 |
| GW-8F1-1R-102517-(20)  | 17J0479-20    | Water  | 25-Oct-2017 14:20 | 25-Oct-2017 15:45 |
| Trip Blanks            | 17J0479-21    | Water  | 23-Oct-2017 00:00 | 25-Oct-2017 15:45 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 25, 2017 under ARI workorder 17J0479. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Sample GW-7E7-2-102517 was reanalyzed at higher reporting limits due to compound concentrations exceeding the upper calibration limits. These compounds have been flagged with an "E" qualifier on the initial run. No further corrective action was taken.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank BFK0004 has Nickel and Arsenic detected below the reporting limits, but above the method detection limits. The Nickel and Arsenic have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFK0084 has Iron detected below the reporting limit, but above the method detection limit. The Iron has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

### **Anions - EPA Method 300.0**

The samples were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFJ0784 has Sulfate detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-6G3-2-102517-(20). The duplicate RPD were within QC limits. The matrix spike has low spike recovery for Nitrite, Fluoride and O-Phos. This is due to high Chloride concentrations and matrix interference. No corrective action was taken.

### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

### **Dissolved Organic Carbon - Method SM5310**



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

**GW-6G3-2-102517**  
**17J0479-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/25/2017 08:40  
Analyzed: 01-Nov-2017 13:04

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.08</b> | ug/L   | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 105 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 98.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 91.7 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102 %  |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517**  
**17J0479-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 08:40  
Analyzed: 07-Nov-2017 19:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517**  
**17J0479-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 08:40  
Analyzed: 07-Nov-2017 19:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2.94</b> | ug/L  | J, D  |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517**  
**17J0479-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 08:40  
Analyzed: 02-Nov-2017 16:50

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517**  
**17J0479-01 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/25/2017 08:40

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1640</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1640</b> | mg/L CaCO3 |       |



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Olympia WA, 98503

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Reported:  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 08:40  
Analyzed: 08-Nov-2017 13:22

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | <b>0.0526</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>220</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>4.13</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>452</b>    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>1.02</b>   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>233</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>23.9</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>5340</b>   | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 08:40  
Analyzed: 09-Nov-2017 22:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 08:40  
Analyzed: 09-Nov-2017 22:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>2.60</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 10       | 3.40            | 5.00            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 10       | 0.500           | 5.00            | ND          | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 08:40  
Analyzed: 08-Nov-2017 14:08

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 08:40  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>14200</b> | mg/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:40  
Analyzed: 26-Oct-2017 14:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |





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Reported:  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/25/2017 08:40  
Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1610   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1610   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 08:40  
Analyzed: 11-Nov-2017 19:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>31.2</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:40  
Analyzed: 26-Oct-2017 19:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.57</b> | mg-P/L | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:40  
Analyzed: 27-Oct-2017 10:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>12.7</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:40  
Analyzed: 27-Oct-2017 17:08

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.560</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:40  
Analyzed: 27-Oct-2017 15:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>121</b> | mg/L  | B, D  |



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**Reported:**  
22-Nov-2017 17:44

**GW-6G3-2-102517-(20)**  
**17J0479-02RE5 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:40  
Analyzed: 28-Oct-2017 17:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>8990</b> | mg/L  | D     |



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Reported:  
22-Nov-2017 17:44

**GW-6H1-1-102517**  
**17J0479-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/25/2017 08:35  
Analyzed: 01-Nov-2017 13:32

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 2 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 99.1 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 90.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.9 % |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517**  
**17J0479-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 08:35  
Analyzed: 07-Nov-2017 20:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>3.46</b> | ug/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517**  
**17J0479-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 08:35  
Analyzed: 09-Nov-2017 00:06

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>563</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>25.6</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>7.97</b> | ug/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517**  
**17J0479-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 08:35  
Analyzed: 02-Nov-2017 16:52

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000200</b> | mg/L  |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 08:35  
Analyzed: 08-Nov-2017 14:28

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.646</b>  | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>0.850</b>  | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>1.74</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>0.242</b>  | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0218</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>2.24</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>12.6</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>211</b>    | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 08:35  
Analyzed: 09-Nov-2017 23:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | <b>2.24</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 08:35  
Analyzed: 09-Nov-2017 23:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>556</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>14.4</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>5.14</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 08:35  
Analyzed: 08-Nov-2017 14:15

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 08:35  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 75 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>640</b> | mg/L  |       |





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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:35  
Analyzed: 26-Oct-2017 15:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/25/2017 08:35

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>143</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-----------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>40.8</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>184</b> | mg/L CaCO3 |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 08:35  
Analyzed: 11-Nov-2017 19:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0217 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>20.9</b> | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:35  
Analyzed: 26-Oct-2017 20:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>3.33</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>3.89</b> | mg-P/L | D     |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:35  
Analyzed: 27-Oct-2017 13:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>28.1</b> | mg/L  | B, D  |



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**Reported:**  
22-Nov-2017 17:44

**GW-6H1-1-102517-(20)**  
**17J0479-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 08:35  
Analyzed: 28-Oct-2017 19:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>184</b> | mg/L  | D     |



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Reported:  
22-Nov-2017 17:44

**GW-7E13-2R-102517**  
**17J0479-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/25/2017 10:15  
Analyzed: 01-Nov-2017 14:00

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 2 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | <b>19.8</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | ND              | ug/L          | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | <b>3.86</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | ND              | ug/L          | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>96.6 %</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>95.4 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>89.1 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>102 %</i>  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517**  
**17J0479-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 10:15  
Analyzed: 07-Nov-2017 20:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 2        | 0.136           | 0.200           | <b>2.52</b> | ug/L  | D     |





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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517**  
**17J0479-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 10:15  
Analyzed: 07-Nov-2017 20:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>411</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>25.7</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>12.8</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517**  
**17J0479-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 10:15  
Analyzed: 02-Nov-2017 16:53

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 10:15  
Analyzed: 08-Nov-2017 13:31

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.333</b>  | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>6.13</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>2.29</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>0.417</b>  | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0707</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>9.81</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>46.8</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>1150</b>   | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 10:15  
Analyzed: 09-Nov-2017 23:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | <b>1.47</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 10:15  
Analyzed: 09-Nov-2017 23:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>287</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>13.3</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>10.1</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 10:15  
Analyzed: 08-Nov-2017 14:16

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 10:15  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 20 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>2750</b> | mg/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 10:15  
Analyzed: 26-Oct-2017 16:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.86</b> | mg-P/L |       |





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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/25/2017 10:15

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 717    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 549    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1270   | mg/L CaCO3 |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 10:15  
Analyzed: 27-Oct-2017 11:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 2        | 0.200           | <b>1.92</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>0.585</b> | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06RE1 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 10:15  
Analyzed: 21-Nov-2017 01:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>99.5</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 10:15  
Analyzed: 27-Oct-2017 14:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>16.5</b> | mg/L  | B, D  |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-7E13-2R-102517-(20)**  
**17J0479-06RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 10:15  
Analyzed: 28-Oct-2017 19:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>904</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

**GW-6D14-1-102517**  
**17J0479-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/25/2017 10:25  
Analyzed: 01-Nov-2017 14:26

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | 1.35     | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | 1.77     | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | 0.96     | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 102   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 90.5  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 98.4  | %     |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517**  
**17J0479-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 10:25  
Analyzed: 07-Nov-2017 19:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517**  
**17J0479-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 10:25  
Analyzed: 08-Nov-2017 23:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 500      | 11.0            | 100             | <b>49100</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 10       | 3.40            | 5.00            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>5.65</b>  | ug/L  | D     |





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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517**  
**17J0479-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 10:25  
Analyzed: 02-Nov-2017 16:59

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 10:25  
Analyzed: 08-Nov-2017 13:40

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | 73.2   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | 323    | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | 35.4   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | 1.40   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | 108    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | 39.2   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | 2830   | mg/L  | D     |



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Reported:  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 10:25  
Analyzed: 09-Nov-2017 22:33

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 500      | 11.0            | 100             | <b>49600</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 10       | 3.40            | 5.00            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>5.21</b>  | ug/L  | D     |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 10:25  
Analyzed: 08-Nov-2017 14:18

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 10:25  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>8300</b> | mg/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 10:25  
Analyzed: 26-Oct-2017 16:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Reported:  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/25/2017 10:25  
Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>386</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>386</b> | mg/L CaCO3 |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 10:25  
Analyzed: 11-Nov-2017 21:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>9.97</b> | mg/L  | D     |





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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 10:25  
Analyzed: 09-Nov-2017 23:36

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 10:25  
Analyzed: 27-Oct-2017 16:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>2.33</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 10:25  
Analyzed: 28-Oct-2017 19:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>4830</b> | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D14-1-102517-(20)**  
**17J0479-08RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 10:25  
Analyzed: 28-Oct-2017 20:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>496</b> | mg/L  | B, D  |



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Reported:  
22-Nov-2017 17:44

**GW-6E1-1-102517**  
**17J0479-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/25/2017 11:20  
Analyzed: 01-Nov-2017 14:52

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.14</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.77</b> | ug/L   |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>1.17</b> | ug/L   |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 99.5 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 88.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 98.9 % |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517**  
**17J0479-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 11:20  
Analyzed: 07-Nov-2017 20:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>1.28</b> | ug/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517**  
**17J0479-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 11:20  
Analyzed: 08-Nov-2017 23:41

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 200      | 4.40            | 40.0            | <b>35300</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>6.24</b>  | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>4.64</b>  | ug/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517**  
**17J0479-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 11:20  
Analyzed: 02-Nov-2017 17:00

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result         | Units | Notes |
|---------|------------|----------|-----------------|----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.00178</b> | mg/L  |       |





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Reported:  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 11:20  
Analyzed: 08-Nov-2017 14:24

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0286</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>28.3</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>0.312</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>21.0</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0635</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>7.62</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>33.9</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>283</b>    | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 11:20  
Analyzed: 09-Nov-2017 23:42

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 11:20  
Analyzed: 10-Nov-2017 22:29

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 500      | 11.0            | 100             | <b>35700</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>3.60</b>  | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>3.63</b>  | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 11:20  
Analyzed: 08-Nov-2017 14:19

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000920</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 11:20  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 75 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>937</b> | mg/L  |       |



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Reported:  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 11:20  
Analyzed: 26-Oct-2017 16:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.224</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.564</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>0.123</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.26</b> | mg-P/L |       |



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Reported:  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/25/2017 11:20

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 338    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 338    | mg/L CaCO3 |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 11:20  
Analyzed: 11-Nov-2017 21:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>5.82</b> | mg/L  | D     |





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**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 11:20  
Analyzed: 28-Oct-2017 20:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>272</b> | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E1-1-102517-(20)**  
**17J0479-10RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 11:20  
Analyzed: 05-Nov-2017 01:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | <b>37.0</b> | mg/L  | B, D  |



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Reported:  
22-Nov-2017 17:44

**GW-6E9-2-102517**  
**17J0479-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/25/2017 11:30  
Analyzed: 01-Nov-2017 15:20

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 2 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | <b>4.50</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | <b>0.49</b> | ug/L   | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 103 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 91.2 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101 %  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517**  
**17J0479-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 11:30  
Analyzed: 07-Nov-2017 19:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517**  
**17J0479-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 11:30  
Analyzed: 08-Nov-2017 23:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2970</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 10       | 3.40            | 5.00            | <b>4.84</b> | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>12.5</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517**  
**17J0479-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 11:30  
Analyzed: 02-Nov-2017 17:02

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 11:30  
Analyzed: 08-Nov-2017 13:50

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0807</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>22.5</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>11.5</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>26.7</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0992</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>70.6</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>25.2</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>3600</b>   | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 11:30  
Analyzed: 09-Nov-2017 22:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |





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Reported:  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 11:30  
Analyzed: 09-Nov-2017 22:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3000</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>9.78</b> | ug/L  | J, D  |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 11:30  
Analyzed: 08-Nov-2017 14:21

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 11:30  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>8320</b> | mg/L  |       |



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Reported:  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 11:30  
Analyzed: 26-Oct-2017 17:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | 3.11   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | 2.69   | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | 5.74   | mg-P/L | D     |



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Reported:  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/25/2017 11:30

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1200   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1200   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 11:30  
Analyzed: 11-Nov-2017 22:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 3.403    | 1.70            | <b>169</b> | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 11:30  
Analyzed: 27-Oct-2017 20:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0820 Sample Size: 5 mL  
Prepared: 27-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>4.84</b> | mg/L  | D     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6E9-2-102517-(20)**  
**17J0479-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 11:30  
Analyzed: 28-Oct-2017 20:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>4990</b> | mg/L  | D     |





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Reported:  
22-Nov-2017 17:44

**GW-5D2-1R-102517**  
**17J0479-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/25/2017 12:35  
Analyzed: 01-Nov-2017 15:48

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 2 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | <b>24.6</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | ND              | ug/L          | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | <b>2.04</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | <b>0.45</b>     | ug/L          | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>94.9 %</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>96.1 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>93.4 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>103 %</i>  |       |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517**  
**17J0479-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 12:35  
Analyzed: 07-Nov-2017 20:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 2        | 0.136           | 0.200           | <b>10.5</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517**  
**17J0479-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 12:35  
Analyzed: 08-Nov-2017 23:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3940</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>53.6</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>15.7</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517**  
**17J0479-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 12:35  
Analyzed: 02-Nov-2017 17:04

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | <b>0.000110</b> | mg/L  |       |



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Reported:  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 12:35  
Analyzed: 08-Nov-2017 14:33

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 10       | 0.0850          | 0.500           | <b>0.156</b>  | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 10       | 0.0510          | 0.500           | <b>2.20</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 10       | 0.0130          | 0.500           | <b>0.263</b>  | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 10       | 0.160           | 0.500           | ND            | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 10       | 0.0034          | 0.0100          | <b>0.0052</b> | mg/L  | J, D  |
| Potassium, Dissolved | 7440-09-7  | 10       | 0.520           | 5.00            | <b>22.6</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 10       | 0.0520          | 0.600           | <b>58.4</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 10       | 19.0            | 500             | <b>1800</b>   | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 12:35  
Analyzed: 09-Nov-2017 22:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | <b>6.04</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 12:35  
Analyzed: 09-Nov-2017 22:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3990</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>32.1</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>14.1</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 12:35  
Analyzed: 08-Nov-2017 14:23

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 12:35  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 10 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 100             | <b>6160</b> | mg/L  |       |



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Reported:  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 12:35  
Analyzed: 26-Oct-2017 18:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | 41.5   | mg/L  | B, D  |



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Reported:  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/25/2017 12:35

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-----------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>1880</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | <b>376</b> | mg/L CaCO3 |       |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>2260</b> | mg/L CaCO3 |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 12:35  
Analyzed: 11-Nov-2017 23:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>28.4</b> | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-5D2-1R-102517-(20)**  
**17J0479-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 12:35  
Analyzed: 28-Oct-2017 21:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1280</b> | mg/L  | D     |



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Reported:  
22-Nov-2017 17:44

**GW-6D25-1-102517**  
**17J0479-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/25/2017 12:40  
Analyzed: 01-Nov-2017 16:14

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | 5.72     | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | 4.72     | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | 0.43     | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 98.8  | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 89.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.9  | %     |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517**  
**17J0479-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 12:40  
Analyzed: 07-Nov-2017 20:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.276</b> | ug/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517**  
**17J0479-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 12:40  
Analyzed: 08-Nov-2017 23:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 50       | 1.10            | 10.0            | <b>5890</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>0.395</b> | ug/L  | J     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>2.85</b>  | ug/L  |       |





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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517**  
**17J0479-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 12:40  
Analyzed: 02-Nov-2017 17:05

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 12:40  
Analyzed: 08-Nov-2017 13:54

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0182</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>23.5</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.661</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>16.7</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.159</b>  | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>11.3</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>44.9</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>429</b>    | mg/L  |       |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 12:40  
Analyzed: 09-Nov-2017 22:43

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>5780</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>1.94</b> | ug/L  | D     |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 12:40  
Analyzed: 08-Nov-2017 14:24

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 12:40  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 50 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1270</b> | mg/L  |       |



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Reported:  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 12:40  
Analyzed: 26-Oct-2017 18:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.202</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.443</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.32</b> | mg-P/L |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/25/2017 12:40  
Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 498    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 498    | mg/L CaCO3 |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 12:40  
Analyzed: 11-Nov-2017 23:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>5.66</b> | mg/L  | D     |





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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 12:40  
Analyzed: 09-Nov-2017 23:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 12:40  
Analyzed: 27-Oct-2017 15:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>25.8</b> | mg/L  | B, D  |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
22-Nov-2017 17:44

**GW-6D25-1-102517-(20)**  
**17J0479-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 12:40  
Analyzed: 28-Oct-2017 21:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>408</b> | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
22-Nov-2017 17:44

**GW-7E7-2-102517**  
**17J0479-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/25/2017 14:15  
Analyzed: 01-Nov-2017 21:44

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0031 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>123</b>      | ug/L          | E     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>416</b>      | ug/L          | E     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>286</b>      | ug/L          | E     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>294</b>      | ug/L          | E     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>107 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>94.1 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>88.3 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>102 %</i>  |       |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517**  
**17J0479-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 14:15  
Analyzed: 07-Nov-2017 20:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.409</b> | ug/L  |       |



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Olympia WA, 98503

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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517**  
**17J0479-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 14:15  
Analyzed: 07-Nov-2017 20:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>157</b>  | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>3.91</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>7.13</b> | ug/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517**  
**17J0479-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 14:15  
Analyzed: 02-Nov-2017 17:07

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050 Sample Size: 20 mL  
Prepared: 02-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517**  
**17J0479-17RE1 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/25/2017 14:15  
Analyzed: 02-Nov-2017 10:53

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 0.2 mL  
Prepared: 02-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 2.86            | 10.0            | <b>66.8</b> | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 1.37            | 10.0            | <b>966</b>  | ug/L   |       |
| Trichloroethene                          | 79-01-6    | 1        | 2.45            | 10.0            | <b>222</b>  | ug/L   |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 2.37            | 10.0            | <b>351</b>  | ug/L   |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 105 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 91.4 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 87.0 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106 %  |       |





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Reported:  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 14:15  
Analyzed: 08-Nov-2017 13:59

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0434</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>37.3</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>0.157</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>10.8</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0104</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>8.51</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>21.8</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>575</b>    | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 14:15  
Analyzed: 09-Nov-2017 23:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.113</b> | ug/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 14:15  
Analyzed: 10-Nov-2017 22:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>155</b>  | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>3.22</b> | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>5.62</b> | ug/L  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 14:15  
Analyzed: 08-Nov-2017 14:30

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 14:15  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 50 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1570</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 14:15  
Analyzed: 26-Oct-2017 18:50

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.925</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.351</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>0.307</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.66</b> | mg-P/L |       |



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Reported:  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/25/2017 14:15  
Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 296    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 241    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 536    | mg/L CaCO3 |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 14:15  
Analyzed: 12-Nov-2017 00:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>38.1</b> | mg/L  | D     |





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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 14:15  
Analyzed: 27-Oct-2017 15:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>23.1</b> | mg/L  | B, D  |



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**Reported:**  
22-Nov-2017 17:44

**GW-7E7-2-102517-(20)**  
**17J0479-18RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 14:15  
Analyzed: 28-Oct-2017 21:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>609</b> | mg/L  | D     |



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Reported:  
22-Nov-2017 17:44

**GW-8F1-1R-102517**  
**17J0479-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/25/2017 14:20  
Analyzed: 02-Nov-2017 09:47

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 1 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | <b>38.2</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND              | ug/L          | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | <b>4.06</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND              | ug/L          | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>106 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>95.2 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>89.0 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>102 %</i>  |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517**  
**17J0479-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 14:20  
Analyzed: 07-Nov-2017 20:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | <b>1.28</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517**  
**17J0479-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 14:20  
Analyzed: 09-Nov-2017 00:01

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0004 Sample Size: 25 mL  
Prepared: 01-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>18.9</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>18.2</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>18.7</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517**  
**17J0479-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 14:20  
Analyzed: 02-Nov-2017 17:08

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0050  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/25/2017 14:20  
Analyzed: 09-Nov-2017 20:14

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 10       | 0.0850          | 0.500           | <b>0.190</b>  | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 10       | 0.0510          | 0.500           | <b>3.44</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 10       | 0.0130          | 0.500           | <b>0.602</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 10       | 0.160           | 0.500           | <b>0.280</b>  | mg/L  | J, D  |
| Manganese, Dissolved | 7439-96-5  | 10       | 0.0034          | 0.0100          | <b>0.0067</b> | mg/L  | J, D  |
| Potassium, Dissolved | 7440-09-7  | 10       | 0.520           | 5.00            | <b>20.9</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 10       | 0.0520          | 0.600           | <b>194</b>    | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 10       | 19.0            | 500             | <b>2780</b>   | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/25/2017 14:20  
Analyzed: 09-Nov-2017 23:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | 1.27   | ug/L  | D     |





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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/25/2017 14:20  
Analyzed: 09-Nov-2017 23:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>22.4</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | <b>18.1</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>17.9</b> | ug/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/25/2017 14:20  
Analyzed: 08-Nov-2017 14:32

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0040  
Prepared: 02-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/25/2017 14:20  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>6320</b> | mg/L  |       |



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Reported:  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 14:20  
Analyzed: 26-Oct-2017 19:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784  
Prepared: 26-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | 6.73   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | 14.4   | mg/L  | B, D  |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/25/2017 14:20

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>50.8</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-----------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>1860</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1910</b> | mg/L CaCO3 |       |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/25/2017 14:20  
Analyzed: 12-Nov-2017 00:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>135</b> | mg/L  | D     |



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**Reported:**  
22-Nov-2017 17:44

**GW-8F1-1R-102517-(20)**  
**17J0479-20RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/25/2017 14:20  
Analyzed: 28-Oct-2017 22:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0784 Sample Size: 5 mL  
Prepared: 26-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>3100</b> | mg/L  | D     |



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Reported:  
22-Nov-2017 17:44

**Trip Blanks**  
**17J0479-21 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/23/2017 00:00  
Analyzed: 01-Nov-2017 12:10

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0013 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 98.6 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.6 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 88.6 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.7 % |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

**Volatile Organic Compounds - Quality Control**

**Batch BFK0013 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0013-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 11:45 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.88            |                 | ug/L  | 5.00        |   | 97.5 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.85            |                 | ug/L  | 5.00        |   | 96.9 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.53            |                 | ug/L  | 5.00        |   | 90.6 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.11            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFK0013-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 09:12 |      |             |      |           |       |
| Vinyl Chloride                           | 11.8   | 0.06            | 0.20            | ug/L  | 10.0        |   | 118  | 66-133      |      |           |       |
| Chloroform                               | 9.12   | 0.03            | 0.20            | ug/L  | 10.0        |   | 91.2 | 80-122      |      |           |       |
| Trichloroethene                          | 9.45   | 0.05            | 0.20            | ug/L  | 10.0        |   | 94.5 | 80-120      |      |           |       |
| Tetrachloroethene                        | 9.65   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.5 | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.54            |                 | ug/L  | 5.00        |   | 90.9 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.71            |                 | ug/L  | 5.00        |   | 94.2 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.00            |                 | ug/L  | 5.00        |   | 99.9 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.63            |                 | ug/L  | 5.00        |   | 92.7 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.87            |                 | ug/L  | 5.00        |   | 97.4 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0013-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 09:38 |      |             |      |           |       |
| Vinyl Chloride                           | 11.9   | 0.06            | 0.20            | ug/L  | 10.0        |   | 119  | 66-133      | 0.49 | 30        |       |
| Chloroform                               | 9.22   | 0.03            | 0.20            | ug/L  | 10.0        |   | 92.2 | 80-122      | 1.04 | 30        |       |
| Trichloroethene                          | 9.57   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.7 | 80-120      | 1.35 | 30        |       |
| Tetrachloroethene                        | 9.49   | 0.05            | 0.20            | ug/L  | 10.0        |   | 94.9 | 80-120      | 1.64 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.49            |                 | ug/L  | 5.00        |   | 89.9 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.86            |                 | ug/L  | 5.00        |   | 97.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.92            |                 | ug/L  | 5.00        |   | 98.5 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.58            |                 | ug/L  | 5.00        |   | 91.7 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.06            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

**Volatile Organic Compounds - Quality Control**

**Batch BFK0031 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: LH

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0031-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 19:42 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.40            |                 | ug/L  | 5.00        |   | 108  | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.77            |                 | ug/L  | 5.00        |   | 95.4 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.38            |                 | ug/L  | 5.00        |   | 87.6 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.30            |                 | ug/L  | 5.00        |   | 106  | 80-120      |      |           |       |
| <b>LCS (BFK0031-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 18:21 |      |             |      |           |       |
| Vinyl Chloride                           | 10.2   | 0.06            | 0.20            | ug/L  | 10.0        |   | 102  | 66-133      |      |           |       |
| Chloroform                               | 11.0   | 0.03            | 0.20            | ug/L  | 10.0        |   | 110  | 80-122      |      |           |       |
| Trichloroethene                          | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |   | 103  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.04            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.14            |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.94            |                 | ug/L  | 5.00        |   | 98.9 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0031-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 01-Nov-2017 Analyzed: 01-Nov-2017 18:41 |      |             |      |           |       |
| Vinyl Chloride                           | 10.8   | 0.06            | 0.20            | ug/L  | 10.0        |   | 108  | 66-133      | 5.75 | 30        |       |
| Chloroform                               | 10.8   | 0.03            | 0.20            | ug/L  | 10.0        |   | 108  | 80-122      | 1.52 | 30        |       |
| Trichloroethene                          | 10.3   | 0.05            | 0.20            | ug/L  | 10.0        |   | 103  | 80-120      | 1.88 | 30        |       |
| Tetrachloroethene                        | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      | 1.73 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.04            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.03            |                 | ug/L  | 5.00        |   | 101  | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.14            |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.87            |                 | ug/L  | 5.00        |   | 97.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |



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Project Number: 79227  
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Reported:  
22-Nov-2017 17:44

**Volatile Organic Compounds - Quality Control**

**Batch BFK0042 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0042-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 09:24 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.79            |                 | ug/L  | 5.00        |   | 95.7 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.47            |                 | ug/L  | 5.00        |   | 89.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 5.12            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFK0042-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 08:03 |      |             |      |           |       |
| Vinyl Chloride                    | 10.4   | 0.06            | 0.20            | ug/L  | 10.0        |   | 104  | 66-133      |      |           |       |
| Chloroform                        | 9.77   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.7 | 80-122      |      |           |       |
| Trichloroethene                   | 9.80   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.0 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.61   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.1 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   |        | 4.95            |                 | ug/L  | 5.00        |   | 99.0 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.62            |                 | ug/L  | 5.00        |   | 92.5 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 5.08            |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.92            |                 | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.92            |                 | ug/L  | 5.00        |   | 98.3 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0042-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 08:44 |      |             |      |           |       |
| Vinyl Chloride                    | 10.6   | 0.06            | 0.20            | ug/L  | 10.0        |   | 106  | 66-133      | 1.67 | 30        |       |
| Chloroform                        | 10.5   | 0.03            | 0.20            | ug/L  | 10.0        |   | 105  | 80-122      | 6.96 | 30        |       |
| Trichloroethene                   | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      | 3.03 | 30        |       |
| Tetrachloroethene                 | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      | 5.61 | 30        |       |
| Surrogate: Dibromofluoromethane   |        | 4.80            |                 | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.56            |                 | ug/L  | 5.00        |   | 91.1 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 5.07            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.88            |                 | ug/L  | 5.00        |   | 97.6 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.90            |                 | ug/L  | 5.00        |   | 98.1 | 80-120      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
22-Nov-2017 17:44

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0004 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0004-BLK1)</b> |         |        |                 |                 |       | Prepared: 01-Nov-2017 Analyzed: 07-Nov-2017 18:05 |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 60      | 0.0800 | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | J     |
| Nickel                      | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>Blank (BFK0004-BLK2)</b> |         |        |                 |                 |       | Prepared: 01-Nov-2017 Analyzed: 08-Nov-2017 16:02 |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic                     | 75a     | 0.0250 | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | J     |
| <b>LCS (BFK0004-BS1)</b>    |         |        |                 |                 |       | Prepared: 01-Nov-2017 Analyzed: 07-Nov-2017 18:55 |               |      |             |     |           |       |
| Lead                        | 208     | 24.3   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 97.4 | 80-120      |     |           |       |
| Arsenic                     | 75a     | 24.4   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 97.6 | 80-120      |     |           |       |
| Copper                      | 63      | 26.4   | 0.340           | 0.500           | ug/L  | 25.0  |               | 106  | 80-120      |     |           |       |
| Copper                      | 65      | 26.6   | 0.350           | 0.500           | ug/L  | 25.0  |               | 106  | 80-120      |     |           |       |
| Nickel                      | 60      | 25.3   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 101  | 80-120      |     |           |       |
| Nickel                      | 62      | 25.6   | 0.220           | 0.500           | ug/L  | 25.0  |               | 102  | 80-120      |     |           |       |
| <b>LCS (BFK0004-BS2)</b>    |         |        |                 |                 |       | Prepared: 01-Nov-2017 Analyzed: 08-Nov-2017 16:33 |               |      |             |     |           |       |
| Lead                        | 208     | 28.1   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 112  | 80-120      |     |           |       |
| Arsenic                     | 75a     | 24.9   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 99.7 | 80-120      |     |           |       |



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**Reported:**  
22-Nov-2017 17:44

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0050 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0050-BLK1)</b> |         |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 16:44 |      |             |     |           |       |
| Mercury                     | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0050-BS1)</b>    |         |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 17:55 |      |             |     |           |       |
| Mercury                     | 0.00236 | 0.000100        | mg/L  | 0.00200     |   | 118  | 80-120      |     |           |       |



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**Reported:**  
22-Nov-2017 17:44

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0040 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0040-BLK1)</b> |         |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 08-Nov-2017 13:43 |      |             |     |           |       |
| Mercury, Dissolved          | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0040-BS1)</b>    |         |                 |       |             | Prepared: 02-Nov-2017 Analyzed: 08-Nov-2017 13:45 |      |             |     |           |       |
| Mercury, Dissolved          | 0.00227 | 0.000100        | mg/L  | 0.00200     |   | 114  | 80-120      |     |           |       |



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Reported:  
22-Nov-2017 17:44

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0071 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0071-BLK1)</b> |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 04:04 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic, Dissolved          | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0071-BS1)</b>    |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 04:57 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | 29.7   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 119  | 80-120      |     |           |       |
| Arsenic, Dissolved          | 75a     | 25.3   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 101  | 80-120      |     |           |       |
| Copper, Dissolved           | 63      | 28.6   | 0.340           | 0.500           | ug/L  | 25.0  |               | 114  | 80-120      |     |           |       |
| Copper, Dissolved           | 65      | 27.6   | 0.350           | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Nickel, Dissolved           | 60      | 27.8   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Nickel, Dissolved           | 62      | 27.8   | 0.220           | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0084 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0084-BLK1)</b> |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 06-Nov-2017 16:23 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Arsenic, Dissolved          | ND     | 0.0047          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0013 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | ND     | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0084-BS1)</b>    |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 06-Nov-2017 16:53 |      |             |     |           |       |
| Aluminum, Dissolved         | 1.95   | 0.0085          | 0.0500          | mg/L  | 2.00        |   | 97.7 | 80-120      |     |           |       |
| Arsenic, Dissolved          | 2.21   | 0.0047          | 0.0500          | mg/L  | 2.00        |   | 111  | 80-120      |     |           |       |
| Calcium, Dissolved          | 10.2   | 0.0051          | 0.0500          | mg/L  | 10.0        |   | 102  | 80-120      |     |           |       |
| Iron, Dissolved             | 1.96   | 0.0013          | 0.0500          | mg/L  | 2.00        |   | 98.0 | 80-120      |     |           |       |
| Magnesium, Dissolved        | 10.4   | 0.0160          | 0.0500          | mg/L  | 10.0        |   | 104  | 80-120      |     |           |       |
| Manganese, Dissolved        | 0.473  | 0.0003          | 0.0010          | mg/L  | 0.500       |   | 94.7 | 80-120      |     |           |       |
| Potassium, Dissolved        | 9.29   | 0.0520          | 0.500           | mg/L  | 10.0        |   | 92.9 | 80-120      |     |           |       |
| Silicon, Dissolved          | 9.96   | 0.0052          | 0.0600          | mg/L  | 10.0        |   | 99.6 | 80-120      |     |           |       |
| Sodium, Dissolved           | 9.99   | 0.0114          | 0.500           | mg/L  | 10.0        |   | 99.9 | 80-120      |     |           |       |
| Sodium, Dissolved           | 9.88   | 1.90            | 50.0            | mg/L  | 10.0        |   | 98.8 | 80-120      |     |           | J     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

Wet Chemistry - Quality Control

Batch BFJ0784 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units  | Spike Level                                       | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---------------------------------|--------|---|--------|---|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0784-BLK1)</b>     |        | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 14:09 |        |   |               |      |             |       |           |       |
| Bromide                         | ND     | 0.100   | mg/L   |   |               |      |             |       |           | U     |
| Chloride                        | ND     | 0.100   | mg/L   |   |               |      |             |       |           | U     |
| Fluoride                        | ND     | 0.100   | mg/L   |   |               |      |             |       |           | U     |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |       |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |       |           | U     |
| Orthophosphorus                 | ND     | 0.10  | mg-P/L |   |               |      |             |       |           | U     |
| Sulfate                         | 0.108  | 0.100   | mg/L   |   |               |      |             |       |           | *     |
| <b>Blank (BFJ0784-BLK2)</b>     |        | Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 10:25 |        |   |               |      |             |       |           |       |
| Orthophosphorus                 | ND     | 0.10  | mg-P/L |   |               |      |             |       |           | U     |
| <b>LCS (BFJ0784-BS1)</b>        |        | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 14:28 |        |   |               |      |             |       |           |       |
| Bromide                         | 1.51   | 0.100   | mg/L   | 1.50  |               | 100  | 90-110      |       |           |       |
| Chloride                        | 1.54   | 0.100   | mg/L   | 1.50  |               | 102  | 90-110      |       |           |       |
| Fluoride                        | 1.55   | 0.100   | mg/L   | 1.50  |               | 103  | 90-110      |       |           |       |
| Nitrate-N                       | 1.56   | 0.100   | mg-N/L | 1.50  |               | 104  | 90-110      |       |           |       |
| Nitrite-N                       | 1.55   | 0.100   | mg-N/L | 1.50  |               | 104  | 90-110      |       |           |       |
| Orthophosphorus                 | 1.49   | 0.10  | mg-P/L | 1.50  |               | 99.5 | 90-110      |       |           |       |
| Sulfate                         | 1.58   | 0.100   | mg/L   | 1.50  |               | 105  | 90-110      |       |           | B     |
| <b>Duplicate (BFJ0784-DUP1)</b> |        | Source: 17J0479-02                                |        | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 15:07 |               |      |             |       |           |       |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |   | ND            |      |             |       |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |   | ND            |      |             |       |           | U     |
| <b>Duplicate (BFJ0784-DUP2)</b> |        | Source: 17J0479-02RE1                             |        | Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 20:09 |               |      |             |       |           |       |
| Orthophosphorus                 | 0.53   | 0.50  | mg-P/L |   | 0.57          |      |             | 7.69  | 20        | D     |
| <b>Duplicate (BFJ0784-DUP3)</b> |        | Source: 17J0479-02RE2                             |        | Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 11:04 |               |      |             |       |           |       |
| Bromide                         | 13.3   | 1.00  | mg/L   |   | 12.7          |      |             | 4.73  | 20        | D     |
| <b>Duplicate (BFJ0784-DUP4)</b> |        | Source: 17J0479-02RE3                             |        | Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 17:28 |               |      |             |       |           |       |
| Fluoride                        | 0.635  | 0.500   | mg/L   |   | 0.560         |      |             | 12.60 | 20        | D     |
| <b>Duplicate (BFJ0784-DUP5)</b> |        | Source: 17J0479-02RE4                             |        | Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 16:09 |               |      |             |       |           |       |
| Sulfate                         | 125    | 10.0  | mg/L   |   | 121           |      |             | 3.26  | 20        | B, D  |
| <b>Duplicate (BFJ0784-DUP6)</b> |        | Source: 17J0479-02RE5                             |        | Prepared: 26-Oct-2017 Analyzed: 28-Oct-2017 17:44 |               |      |             |       |           |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

Wet Chemistry - Quality Control

Batch BFJ0784 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Duplicate (BFJ0784-DUP6)</b> Source: 17J0479-02RE5 Prepared: 26-Oct-2017 Analyzed: 28-Oct-2017 17:44   |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 8790   | 500             | mg/L   |             | 8990          |      |             | 2.21 | 20        | D     |
| <b>Duplicate (BFJ0784-DUP7)</b> Source: 17J0479-02RE5 Prepared: 26-Oct-2017 Analyzed: 28-Oct-2017 18:04   |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 8830   | 500             | mg/L   |             | 8990          |      |             | 1.81 | 20        | D     |
| <b>Matrix Spike (BFJ0784-MS1)</b> Source: 17J0479-02 Prepared: 26-Oct-2017 Analyzed: 26-Oct-2017 15:27    |        |                 |        |             |               |      |             |      |           |       |
| Nitrate-N   | 1.97   | 0.100           | mg-N/L | 2.00        | ND            | 98.4 | 75-125      |      |           |       |
| Nitrite-N   | 1.15   | 0.100           | mg-N/L | 2.00        | ND            | 57.5 | 75-125      |      |           | *     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0784-MS4)</b> Source: 17J0479-02RE2 Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 11:23 |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 33.3   | 2.00            | mg/L   | 20.0        | 12.7          | 103  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0784-MS5)</b> Source: 17J0479-02RE3 Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 13:03 |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 1.50   | 0.500           | mg/L   | 2.00        | 0.560         | 47.1 | 75-125      |      |           | *, D  |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0784-MS6)</b> Source: 17J0479-02RE4 Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 16:28 |        |                 |        |             |               |      |             |      |           |       |
| Sulfate   | 326    | 20.0            | mg/L   | 200         | 121           | 102  | 75-125      |      |           | B, D  |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0784-MS7)</b> Source: 17J0479-02RE1 Prepared: 26-Oct-2017 Analyzed: 27-Oct-2017 13:03 |        |                 |        |             |               |      |             |      |           |       |
| Orthophosphorus   | 1.51   | 0.50            | mg-P/L | 2.00        | 0.57          | 47.4 | 75-125      |      |           | *, D  |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**Wet Chemistry - Quality Control**

**Batch BFJ0820 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0820-BLK1)</b> |        |                 |       |             | Prepared: 27-Oct-2017 Analyzed: 27-Oct-2017 18:49 |      |             |     |           |       |
| Sulfate                     | ND     | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0820-BS1)</b>    |        |                 |       |             | Prepared: 27-Oct-2017 Analyzed: 27-Oct-2017 19:09 |      |             |     |           |       |
| Sulfate                     | 1.56   | 0.100           | mg/L  | 1.50        |   | 104  | 90-110      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**Wet Chemistry - Quality Control**

**Batch BFJ0837 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit | Units      | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|------------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0837-BLK1)</b>     |        |                 |            |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 10:29 |      |             |     |           |       |
| Alkalinity, Total               | ND     | 1.00            | mg/L CaCO3 |             |   |      |             |     |           | U     |
| <b>Reference (BFJ0837-SRM1)</b> |        |                 |            |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 10:29 |      |             |     |           |       |
| Alkalinity, Total               | 105    | 1.00            | mg/L CaCO3 | 108         |   | 97.7 | 0-200       |     |           |       |



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**Wet Chemistry - Quality Control**

**Batch BFJ0849 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0849-BLK1)</b> |        |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 13:02 |      |             |     |           |       |
| Dissolved Solids            | ND     | 5.0             | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0849-BS1)</b>    |        |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 13:02 |      |             |     |           |       |
| Dissolved Solids            | 503    | 5.0             | mg/L  | 500         |   | 101  | 90-110      |     |           |       |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>22-Nov-2017 17:44 |
|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFK0217 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: GM

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0217-BLK1)</b>         |        |                 |       |             | Prepared: 08-Nov-2017 Analyzed: 09-Nov-2017 17:20 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
22-Nov-2017 17:44

**Wet Chemistry - Quality Control**

**Batch BFK0300 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0300-BLK1)</b>         |        |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 20:31 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0300-BS1)</b>            |        |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 20:50 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 20.9   | 0.50            | mg/L  | 20.0        |   | 104  | 90-110      |     |           |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

### Certified Analyses included in this Report

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Arsenic                           | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
22-Nov-2017 17:44

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Chloromethane                         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Nov-2017 17:44

|                             |                                 |
|-----------------------------|---------------------------------|
| Dibromochloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |



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**Reported:**  
22-Nov-2017 17:44

Alkalinity, Total

DoD-ELAP,WADOE,WA-DW,NELAP

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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**Reported:**  
22-Nov-2017 17:44

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



20 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0505

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*









WORK ORDER

17J0505

Client: Pioneer Technologies Corporation      Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio      Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                    | pH  |      |
|--------------|-----------------------------------|-----|------|
| 17J0505-01 A | VOA Vial, Amber, 40 mL, HCL       |     |      |
| 17J0505-01 B | VOA Vial, Amber, 40 mL, HCL       |     |      |
| 17J0505-01 C | VOA Vial, Amber, 40 mL, HCL       |     |      |
| 17J0505-01 D | HDPE NM, 500 mL, 1:1 HNO3         | < 2 | pass |
| 17J0505-02 A | Glass NM, Amber, 250 mL, 9N H2SO4 | < 2 | pass |
| 17J0505-02 B | Small OJ, 500 mL                  |     |      |
| 17J0505-02 C | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | < 2 | pass |
| 17J0505-02 D | Large OJ, 1000 mL                 |     |      |
| 17J0505-03 A | VOA Vial, Clear, 40 mL, HCL       |     |      |

BF  
Preservation Confirmed By

10/27/17  
Date





# Cooler Receipt Form

ARI Client: Pioneer Technologies

Project Name: <sup>SBW</sup> 7777 Arkema FSDG IAW

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: \_\_\_\_\_

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) Time: 1415 9.48

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: 1005206

Cooler Accepted by: SBW Date: 10/26/2017 Time: 1415

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO

Were all VOC vials free of air bubbles? ..... NA YES  NO  BF

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI..... NA 10/23/17

Was Sample Split by ARI :  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: BF Date: 10/27/17 Time: 9:58

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

TB had 1g air bubble

By: BF Date: 10/27/17

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |







Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227

Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 13:31

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                    | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|------------------------------|---------------|--------|-------------------|-------------------|
| GW-1B4-1-102617-2.9-7.9      | 17J0505-01    | Water  | 26-Oct-2017 11:45 | 26-Oct-2017 14:15 |
| GW-1B4-1-102617-2.9-7.9-(20) | 17J0505-02    | Water  | 26-Oct-2017 11:45 | 26-Oct-2017 14:15 |
| TB                           | 17J0505-03    | Water  | 23-Oct-2017 00:00 | 26-Oct-2017 14:15 |



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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 26, 2017 under ARI workorder 17J0505. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-1b4-1-102617-2.9-7.9. The matrix spike percent recovery was within QC limits. The duplicate has a concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. This is likely matrix interference. The Mercury has been flagged with an "L" qualifier on the duplicate. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-1B4-1-102617-2.9-7.9-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.



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Reported:  
20-Nov-2017 13:31

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-1B4-102617-2.9-7.9. The duplicate RPD were within QC limits. The matrix spike has a natural concentration of Arsenic that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Arsenic has been flagged with an "HC" qualifier on the matrix spike. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-1B4-102617-2.9-7.9-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Sample GW-1B4-1-102617-2.9-7.9-(20) has a Sodium concentration that exceeds the upper calibration limit, and has been flagged with an "E" qualifier.

Initial and continuing calibrations were within method requirements.

Method blank BFK0084 has Iron detected below the reporting limit, but above the method detection limit. The Iron has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-1B4-1-102617-2.9-7.9-(20). The duplicate RPD were within QC limits. The matrix spike and duplicate have a Sodium concentration that exceeds the upper calibration range. The Sodium has been flagged with an "E" qualifier. The matrix spike has natural concentrations of Calcium and Magnesium that are so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. This is due to high salt content causing matrix interference. These metals have been flagged with an "HC" qualifier on the matrix spike. No further corrective action was taken.

#### **Anions - EPA Method 300.0**

The samples were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-1B4-1-102617-2.9-7.9-(20). The matrix spike percent recovery and duplicate RPD were within QC limits. The matrix spike has a Fluoride concentration that exceeds the upper calibration range. The Fluoride has been flagged with an "E" qualifier.



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20-Nov-2017 13:31

### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

A duplicate was prepared in conjunction with sampe GW-1B4-1-102617-2.9-7.9-(20). The duplicate RPD was within QC limits.

### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample GW-1B4-1-102617-2.9-7.9-(20). The duplicate RPD was within QC limits.

### **Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample GW-1B4-1-102617-2.9-7.9-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.



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Reported:  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9**  
**17J0505-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/26/2017 11:45  
Analyzed: 31-Oct-2017 15:36

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0888 Sample Size: 10 mL  
Prepared: 31-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|--|------------|----------|-----------------|-----------------|-------------|----------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L     | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L     | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L     | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L     | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 | <i>80-129 %</i> | <i>114</i>  | <i>%</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 | <i>80-120 %</i> | <i>93.5</i> | <i>%</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 | <i>80-120 %</i> | <i>86.1</i> | <i>%</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 | <i>80-120 %</i> | <i>105</i>  | <i>%</i> |       |



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**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9**  
**17J0505-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/26/2017 11:45  
Analyzed: 07-Nov-2017 17:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0074 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>1.50</b> | ug/L  |       |



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**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9**  
**17J0505-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/26/2017 11:45  
Analyzed: 07-Nov-2017 17:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0074 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>129</b>  | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>21.5</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>21.8</b> | ug/L  |       |





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**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9**  
**17J0505-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/26/2017 11:45  
Analyzed: 08-Nov-2017 15:12

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0173  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/26/2017 11:45  
Analyzed: 08-Nov-2017 12:54

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0084  
Prepared: 03-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0170</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>104</b>    | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.407</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>61.4</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.117</b>  | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>4.16</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>16.7</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | <b>50.9</b>   | mg/L  | E     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/26/2017 11:45  
Analyzed: 09-Nov-2017 22:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0169 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/26/2017 11:45  
Analyzed: 09-Nov-2017 22:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0169 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>52.1</b> | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>14.5</b> | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>18.4</b> | ug/L  |       |



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**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/26/2017 11:45  
Analyzed: 08-Nov-2017 14:36

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0133 Sample Size: 20 mL  
Prepared: 06-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/26/2017 11:45  
Analyzed: 30-Oct-2017 13:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0849 Sample Size: 100 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>648</b> | mg/L  |       |



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Reported:  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/26/2017 11:45  
Analyzed: 27-Oct-2017 20:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0820  
Prepared: 27-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.124</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.817</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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Reported:  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/26/2017 11:45  
Analyzed: 30-Oct-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0837 Sample Size: 50 mL  
Prepared: 30-Oct-2017 Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 509    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 509    | mg/L CaCO3 |       |





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**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/26/2017 11:45  
Analyzed: 12-Nov-2017 01:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 15.2   | mg/L  | D     |



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**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/26/2017 11:45  
Analyzed: 29-Oct-2017 00:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0820 Sample Size: 5 mL  
Prepared: 27-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | <b>66.3</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 13:31

**GW-1B4-1-102617-2.9-7.9-(20)**  
**17J0505-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/26/2017 11:45  
Analyzed: 29-Oct-2017 01:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0820 Sample Size: 5 mL  
Prepared: 27-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 10       | 1.00            | <b>15.6</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

**TB**  
**17J0505-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/23/2017 00:00  
Analyzed: 31-Oct-2017 12:33

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFJ0888 Sample Size: 10 mL  
Prepared: 31-Oct-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 103   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 90.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 107   | %     |



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Reported:  
20-Nov-2017 13:31

**Volatile Organic Compounds - Quality Control**

**Batch BFJ0888 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PC

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0888-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 11:52 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.17            |                 | ug/L  | 5.00        |   | 103  | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.77            |                 | ug/L  | 5.00        |   | 95.5 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.61            |                 | ug/L  | 5.00        |   | 92.1 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <b>LCS (BFJ0888-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 10:21 |      |             |      |           |       |
| Vinyl Chloride                           | 9.88   | 0.06            | 0.20            | ug/L  | 10.0        |   | 98.8 | 66-133      |      |           |       |
| Chloroform                               | 9.62   | 0.03            | 0.20            | ug/L  | 10.0        |   | 96.2 | 80-122      |      |           |       |
| Trichloroethene                          | 9.77   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.7 | 80-120      |      |           |       |
| Tetrachloroethene                        | 9.79   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.9 | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.74            |                 | ug/L  | 5.00        |   | 94.7 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.66            |                 | ug/L  | 5.00        |   | 93.1 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.01            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.92            |                 | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.03            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFJ0888-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 10:42 |      |             |      |           |       |
| Vinyl Chloride                           | 10.0   | 0.06            | 0.20            | ug/L  | 10.0        |   | 100  | 66-133      | 1.52 | 30        |       |
| Chloroform                               | 10.1   | 0.03            | 0.20            | ug/L  | 10.0        |   | 101  | 80-122      | 4.39 | 30        |       |
| Trichloroethene                          | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      | 3.00 | 30        |       |
| Tetrachloroethene                        | 10.0   | 0.05            | 0.20            | ug/L  | 10.0        |   | 100  | 80-120      | 2.34 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.78            |                 | ug/L  | 5.00        |   | 95.7 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.68            |                 | ug/L  | 5.00        |   | 93.5 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.07            |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.90            |                 | ug/L  | 5.00        |   | 98.1 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.84            |                 | ug/L  | 5.00        |   | 96.9 | 80-120      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
20-Nov-2017 13:31

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0074 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFK0074-BLK1)</b>       |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 16:54                    |               |      |             |       |           |       |
| Lead                              | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |      |             |       |           | U     |
| Arsenic                           | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |       |           | U     |
| Copper                            | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Copper                            | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel                            | 60      | ND     | 0.0500          | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel                            | 62      | ND     | 0.220           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| <b>LCS (BFK0074-BS1)</b>          |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 17:15                    |               |      |             |       |           |       |
| Lead                              | 208     | 25.8   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 103  | 80-120      |       |           |       |
| Arsenic                           | 75a     | 25.4   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 102  | 80-120      |       |           |       |
| Copper                            | 63      | 27.2   | 0.340           | 0.500           | ug/L  | 25.0   |               | 109  | 80-120      |       |           |       |
| Copper                            | 65      | 27.7   | 0.350           | 0.500           | ug/L  | 25.0   |               | 111  | 80-120      |       |           |       |
| Nickel                            | 60      | 27.2   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 109  | 80-120      |       |           |       |
| Nickel                            | 62      | 26.9   | 0.220           | 0.500           | ug/L  | 25.0   |               | 108  | 80-120      |       |           |       |
| <b>Duplicate (BFK0074-DUP1)</b>   |         |        |                 |                 |       | Source: 17J0505-01 Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 16:59 |               |      |             |       |           |       |
| Lead                              | 208     | 1.49   | 0.0680          | 0.100           | ug/L  |  | 1.50          |      |             | 1.07  | 20        |       |
| Arsenic                           | 75a     | 111    | 0.0220          | 0.200           | ug/L  |  | 129           |      |             | 14.40 | 20        |       |
| Copper                            | 63      | 20.0   | 0.340           | 0.500           | ug/L  |  | 21.5          |      |             | 6.95  | 20        |       |
| Nickel                            | 60      | 19.7   | 0.0500          | 0.500           | ug/L  |  | 21.8          |      |             | 9.95  | 20        |       |
| <b>Matrix Spike (BFK0074-MS1)</b> |         |        |                 |                 |       | Source: 17J0505-01 Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 17:09 |               |      |             |       |           |       |
| Lead                              | 208     | 26.4   | 0.0680          | 0.100           | ug/L  | 25.0   | 1.50          | 99.6 | 75-125      |       |           |       |
| Arsenic                           | 75a     | 145    | 0.0220          | 0.200           | ug/L  | 25.0   | 129           | 64.5 | 75-125      |       |           | HC    |
| Copper                            | 63      | 46.0   | 0.340           | 0.500           | ug/L  | 25.0   | 21.5          | 98.0 | 75-125      |       |           |       |
| Nickel                            | 60      | 46.4   | 0.0500          | 0.500           | ug/L  | 25.0   | 21.8          | 98.4 | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0173 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit           | Units | Spike Level                                       | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-------|---|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0173-BLK1)</b>       |         |                           |       |   |   |      |             |     |           |       |
|                                   |         |                           |       |   | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:08 |      |             |     |           |       |
| Mercury                           | ND      | 0.000100                  | mg/L  |   |   |      |             |     |           | U     |
| <b>LCS (BFK0173-BS1)</b>          |         |                           |       |   |   |      |             |     |           |       |
|                                   |         |                           |       |   | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:10 |      |             |     |           |       |
| Mercury                           | 0.00229 | 0.000100                  | mg/L  | 0.00200   |   | 115  | 80-120      |     |           |       |
| <b>Duplicate (BFK0173-DUP1)</b>   |         |                           |       |   |   |      |             |     |           |       |
|                                   |         | <b>Source: 17J0505-01</b> |       | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:13 |   |      |             |     |           |       |
| Mercury                           | ND      | 0.000100                  | mg/L  |   | ND  |      |             |     |           | L, U  |
| <b>Matrix Spike (BFK0173-MS1)</b> |         |                           |       |   |   |      |             |     |           |       |
|                                   |         | <b>Source: 17J0505-01</b> |       | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 17:57 |   |      |             |     |           |       |
| Mercury                           | 0.00122 | 0.000100                  | mg/L  | 0.00100   | ND  | 117  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0084 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|--------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0084-BLK1)</b>       |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 03-Nov-2017 Analyzed: 06-Nov-2017 16:23 |      |             |      |           |       |
| Aluminum, Dissolved               | ND     | 0.0085          | 0.0500             | mg/L  |             |   |      |             |      |           | U     |
| Arsenic, Dissolved                | ND     | 0.0047          | 0.0500             | mg/L  |             |   |      |             |      |           | U     |
| Calcium, Dissolved                | ND     | 0.0051          | 0.0500             | mg/L  |             |   |      |             |      |           | U     |
| Iron, Dissolved                   | 0.0013 | 0.0013          | 0.0500             | mg/L  |             |   |      |             |      |           | J     |
| Magnesium, Dissolved              | ND     | 0.0160          | 0.0500             | mg/L  |             |   |      |             |      |           | U     |
| Manganese, Dissolved              | ND     | 0.0003          | 0.0010             | mg/L  |             |   |      |             |      |           | U     |
| Potassium, Dissolved              | ND     | 0.0520          | 0.500              | mg/L  |             |   |      |             |      |           | U     |
| Silicon, Dissolved                | ND     | 0.0052          | 0.0600             | mg/L  |             |   |      |             |      |           | U     |
| Sodium, Dissolved                 | ND     | 0.0114          | 0.500              | mg/L  |             |   |      |             |      |           | U     |
| Sodium, Dissolved                 | ND     | 1.90            | 50.0               | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFK0084-BS1)</b>          |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 03-Nov-2017 Analyzed: 06-Nov-2017 16:53 |      |             |      |           |       |
| Aluminum, Dissolved               | 1.95   | 0.0085          | 0.0500             | mg/L  | 2.00        |   | 97.7 | 80-120      |      |           |       |
| Arsenic, Dissolved                | 2.21   | 0.0047          | 0.0500             | mg/L  | 2.00        |   | 111  | 80-120      |      |           |       |
| Calcium, Dissolved                | 10.2   | 0.0051          | 0.0500             | mg/L  | 10.0        |   | 102  | 80-120      |      |           |       |
| Iron, Dissolved                   | 1.96   | 0.0013          | 0.0500             | mg/L  | 2.00        |   | 98.0 | 80-120      |      |           |       |
| Magnesium, Dissolved              | 10.4   | 0.0160          | 0.0500             | mg/L  | 10.0        |   | 104  | 80-120      |      |           |       |
| Manganese, Dissolved              | 0.473  | 0.0003          | 0.0010             | mg/L  | 0.500       |   | 94.7 | 80-120      |      |           |       |
| Potassium, Dissolved              | 9.29   | 0.0520          | 0.500              | mg/L  | 10.0        |   | 92.9 | 80-120      |      |           |       |
| Silicon, Dissolved                | 9.96   | 0.0052          | 0.0600             | mg/L  | 10.0        |   | 99.6 | 80-120      |      |           |       |
| Sodium, Dissolved                 | 9.99   | 0.0114          | 0.500              | mg/L  | 10.0        |   | 99.9 | 80-120      |      |           |       |
| Sodium, Dissolved                 | 9.88   | 1.90            | 50.0               | mg/L  | 10.0        |   | 98.8 | 80-120      |      |           | J     |
| <b>Duplicate (BFK0084-DUP2)</b>   |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 | Source: 17J0505-02 |       |             | Prepared: 03-Nov-2017 Analyzed: 08-Nov-2017 12:50 |      |             |      |           |       |
| Aluminum, Dissolved               | ND     | 0.0085          | 0.0500             | mg/L  |             | 0.0170  |      |             |      |           | U     |
| Arsenic, Dissolved                | 0.0807 | 0.0047          | 0.0500             | mg/L  |             | 0.0794  |      |             | 1.68 | 20        |       |
| Calcium, Dissolved                | 104    | 0.0051          | 0.0500             | mg/L  |             | 104   |      |             | 0.09 | 20        |       |
| Iron, Dissolved                   | 0.412  | 0.0013          | 0.0500             | mg/L  |             | 0.407   |      |             | 1.18 | 20        |       |
| Magnesium, Dissolved              | 61.8   | 0.0160          | 0.0500             | mg/L  |             | 61.4  |      |             | 0.67 | 20        |       |
| Manganese, Dissolved              | 0.119  | 0.0003          | 0.0010             | mg/L  |             | 0.117   |      |             | 1.59 | 20        |       |
| Potassium, Dissolved              | 4.16   | 0.0520          | 0.500              | mg/L  |             | 4.16  |      |             | 0.10 | 20        |       |
| Silicon, Dissolved                | 16.9   | 0.0052          | 0.0600             | mg/L  |             | 16.7  |      |             | 1.24 | 20        |       |
| Sodium, Dissolved                 | 51.0   | 0.0114          | 0.500              | mg/L  |             | 50.9  |      |             | 0.04 | 20        | E     |
| Sodium, Dissolved                 | 47.9   | 1.90            | 50.0               | mg/L  |             | 47.1  |      |             | 1.71 | 20        | J     |
| <b>Matrix Spike (BFK0084-MS2)</b> |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 | Source: 17J0505-02 |       |             | Prepared: 03-Nov-2017 Analyzed: 08-Nov-2017 12:59 |      |             |      |           |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0084 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit           | Reporting Limit | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|-----------------|-------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFK0084-MS2)</b> |        | <b>Source: 17J0505-02</b> |                 |       | Prepared: 03-Nov-2017 |               | Analyzed: 08-Nov-2017 12:59 |             |     |           |       |
| Aluminum, Dissolved               | 2.08   | 0.0085                    | 0.0500          | mg/L  | 2.00                  | 0.0170        | 103                         | 75-125      |     |           |       |
| Arsenic, Dissolved                | 2.29   | 0.0047                    | 0.0500          | mg/L  | 2.00                  | 0.0794        | 111                         | 75-125      |     |           |       |
| Calcium, Dissolved                | 111    | 0.0051                    | 0.0500          | mg/L  | 10.0                  | 104           | 65.1                        | 75-125      |     |           | HC    |
| Iron, Dissolved                   | 2.42   | 0.0013                    | 0.0500          | mg/L  | 2.00                  | 0.407         | 101                         | 75-125      |     |           |       |
| Magnesium, Dissolved              | 68.2   | 0.0160                    | 0.0500          | mg/L  | 10.0                  | 61.4          | 67.9                        | 75-125      |     |           | HC    |
| Manganese, Dissolved              | 0.591  | 0.0003                    | 0.0010          | mg/L  | 0.500                 | 0.117         | 94.8                        | 75-125      |     |           |       |
| Potassium, Dissolved              | 14.1   | 0.0520                    | 0.500           | mg/L  | 10.0                  | 4.16          | 99.7                        | 75-125      |     |           |       |
| Silicon, Dissolved                | 26.4   | 0.0052                    | 0.0600          | mg/L  | 10.0                  | 16.7          | 97.5                        | 75-125      |     |           |       |
| Sodium, Dissolved                 | 61.5   | 0.0114                    | 0.500           | mg/L  | 10.0                  | 50.9          | 105                         | 75-125      |     |           | E     |
| Sodium, Dissolved                 | 57.7   | 1.90                      | 50.0            | mg/L  | 10.0                  | 47.1          | 105                         | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0133 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0133-BLK1)</b>       |         | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:33 |       |   |               |      |             |     |           |       |
| Mercury, Dissolved                | ND      | 0.000100  | mg/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0133-BS1)</b>          |         | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:35 |       |   |               |      |             |     |           |       |
| Mercury, Dissolved                | 0.00229 | 0.000100  | mg/L  | 0.00200   |               | 115  | 80-120      |     |           |       |
| <b>Duplicate (BFK0133-DUP1)</b>   |         | <b>Source: 17J0505-02</b>                         |       | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:38 |               |      |             |     |           |       |
| Mercury, Dissolved                | ND      | 0.000100  | mg/L  |   | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BFK0133-MS1)</b> |         | <b>Source: 17J0505-02</b>                         |       | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:40 |               |      |             |     |           |       |
| Mercury, Dissolved                | 0.00114 | 0.000100  | mg/L  | 0.00100   | ND            | 112  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0169 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result | Detection Limit  | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|---------|--------|--|-----------------|-------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0169-BLK1)</b>       |         |        | Prepared: 07-Nov-2017 Analyzed: 09-Nov-2017 21:30                    |                 |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680   | 0.100           | ug/L  |             |               |      |             |      |           | U     |
| Arsenic, Dissolved                | 75a     | ND     | 0.0220   | 0.200           | ug/L  |             |               |      |             |      |           | U     |
| Copper, Dissolved                 | 63      | ND     | 0.340  | 0.500           | ug/L  |             |               |      |             |      |           | U     |
| Copper, Dissolved                 | 65      | ND     | 0.350  | 0.500           | ug/L  |             |               |      |             |      |           | U     |
| Nickel, Dissolved                 | 60      | ND     | 0.0500   | 0.500           | ug/L  |             |               |      |             |      |           | U     |
| Nickel, Dissolved                 | 62      | ND     | 0.220  | 0.500           | ug/L  |             |               |      |             |      |           | U     |
| <b>LCS (BFK0169-BS1)</b>          |         |        | Prepared: 07-Nov-2017 Analyzed: 09-Nov-2017 22:14                    |                 |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | 29.3   | 0.0680   | 0.100           | ug/L  | 25.0        |               | 117  | 80-120      |      |           |       |
| Arsenic, Dissolved                | 75a     | 24.6   | 0.0220   | 0.200           | ug/L  | 25.0        |               | 98.3 | 80-120      |      |           |       |
| Copper, Dissolved                 | 63      | 26.0   | 0.340  | 0.500           | ug/L  | 25.0        |               | 104  | 80-120      |      |           |       |
| Copper, Dissolved                 | 65      | 25.5   | 0.350  | 0.500           | ug/L  | 25.0        |               | 102  | 80-120      |      |           |       |
| Nickel, Dissolved                 | 60      | 26.0   | 0.0500   | 0.500           | ug/L  | 25.0        |               | 104  | 80-120      |      |           |       |
| Nickel, Dissolved                 | 62      | 25.9   | 0.220  | 0.500           | ug/L  | 25.0        |               | 104  | 80-120      |      |           |       |
| <b>Duplicate (BFK0169-DUP1)</b>   |         |        | Source: 17J0505-02 Prepared: 07-Nov-2017 Analyzed: 09-Nov-2017 22:00 |                 |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680   | 0.100           | ug/L  |             | ND            |      |             |      |           | U     |
| Arsenic, Dissolved                | 75a     | 52.7   | 0.0220   | 0.200           | ug/L  |             | 52.1          |      |             | 1.20 | 20        |       |
| Copper, Dissolved                 | 63      | 14.5   | 0.340  | 0.500           | ug/L  |             | 14.5          |      |             | 0.30 | 20        |       |
| Nickel, Dissolved                 | 60      | 19.2   | 0.0500   | 0.500           | ug/L  |             | 18.4          |      |             | 3.93 | 20        |       |
| <b>Matrix Spike (BFK0169-MS1)</b> |         |        | Source: 17J0505-02 Prepared: 07-Nov-2017 Analyzed: 09-Nov-2017 22:10 |                 |       |             |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | 25.6   | 0.0680   | 0.100           | ug/L  | 25.0        | ND            | 102  | 75-125      |      |           |       |
| Arsenic, Dissolved                | 75a     | 77.8   | 0.0220   | 0.200           | ug/L  | 25.0        | 52.1          | 103  | 75-125      |      |           |       |
| Copper, Dissolved                 | 63      | 38.1   | 0.340  | 0.500           | ug/L  | 25.0        | 14.5          | 94.3 | 75-125      |      |           |       |
| Nickel, Dissolved                 | 60      | 42.9   | 0.0500   | 0.500           | ug/L  | 25.0        | 18.4          | 97.7 | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

Wet Chemistry - Quality Control

Batch BFJ0820 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0820-BLK1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 27-Oct-2017 Analyzed: 27-Oct-2017 18:49                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| <b>Blank (BFJ0820-BLK2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 27-Oct-2017 Analyzed: 29-Oct-2017 08:08                       |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| <b>LCS (BFJ0820-BS1)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 27-Oct-2017 Analyzed: 27-Oct-2017 19:09                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.49   | 0.100           | mg/L   | 1.50        |               | 99.4 | 90-110      |      |           |       |
| Fluoride  | 1.53   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| Nitrate-N   | 1.55   | 0.100           | mg-N/L | 1.50        |               | 103  | 90-110      |      |           |       |
| Nitrite-N   | 1.55   | 0.100           | mg-N/L | 1.50        |               | 103  | 90-110      |      |           |       |
| Orthophosphorus   | 1.42   | 0.10            | mg-P/L | 1.50        |               | 94.5 | 90-110      |      |           |       |
| Sulfate   | 1.56   | 0.100           | mg/L   | 1.50        |               | 104  | 90-110      |      |           |       |
| <b>LCS (BFJ0820-BS2)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 27-Oct-2017 Analyzed: 29-Oct-2017 08:28                       |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 1.51   | 0.100           | mg/L   | 1.50        |               | 101  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0820-DUP1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0505-02 Prepared: 27-Oct-2017 Analyzed: 27-Oct-2017 20:50    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 0.126  | 0.100           | mg/L   |             | 0.124         |      |             | 1.60 | 20        |       |
| Fluoride  | 0.805  | 0.100           | mg/L   |             | 0.817         |      |             | 1.48 | 20        |       |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             | ND            |      |             |      |           | U     |
| <b>Duplicate (BFJ0820-DUP2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0505-02RE1 Prepared: 27-Oct-2017 Analyzed: 29-Oct-2017 00:47 |        |                 |        |             |               |      |             |      |           |       |
| Sulfate   | 68.0   | 5.00            | mg/L   |             | 66.3          |      |             | 2.52 | 20        | D     |
| <b>Duplicate (BFJ0820-DUP3)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0505-02RE2 Prepared: 27-Oct-2017 Analyzed: 29-Oct-2017 01:46 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 15.5   | 1.00            | mg/L   |             | 15.6          |      |             | 0.54 | 20        | D     |
| <b>Matrix Spike (BFJ0820-MS1)</b>                                       |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0505-02 Prepared: 27-Oct-2017 Analyzed: 27-Oct-2017 21:11    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.85   | 0.100           | mg/L   | 2.00        | 0.124         | 86.4 | 75-125      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 13:31

### Wet Chemistry - Quality Control

#### Batch BFJ0820 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit           | Units  | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|--------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFJ0820-MS1)</b> |        | <b>Source: 17J0505-02</b> |        | Prepared: 27-Oct-2017 |               | Analyzed: 27-Oct-2017 21:11 |             |     |           |       |
| Fluoride                          | 2.69   | 0.100                     | mg/L   | 2.00                  | 0.817         | 93.6                        | 75-125      |     |           | E     |
| Nitrate-N                         | 2.07   | 0.100                     | mg-N/L | 2.00                  | ND            | 103                         | 75-125      |     |           |       |
| Nitrite-N                         | 1.97   | 0.100                     | mg-N/L | 2.00                  | ND            | 98.3                        | 75-125      |     |           |       |
| Orthophosphorus                   | 1.80   | 0.10                      | mg-P/L | 2.00                  | ND            | 89.8                        | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |     |                              |      |                       |      |                             |        |  |  |   |
|-----------------------------------|-----|------------------------------|------|-----------------------|------|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFJ0820-MS2)</b> |     | <b>Source: 17J0505-02RE1</b> |      | Prepared: 27-Oct-2017 |      | Analyzed: 29-Oct-2017 01:07 |        |  |  |   |
| Sulfate                           | 180 | 10.0                         | mg/L | 100                   | 66.3 | 113                         | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                              |      |                       |      |                             |        |  |  |   |
|-----------------------------------|------|------------------------------|------|-----------------------|------|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFJ0820-MS3)</b> |      | <b>Source: 17J0505-02RE2</b> |      | Prepared: 27-Oct-2017 |      | Analyzed: 29-Oct-2017 02:05 |        |  |  |   |
| Chloride                          | 35.1 | 2.00                         | mg/L | 20.0                  | 15.6 | 97.5                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Reported:  
20-Nov-2017 13:31

**Wet Chemistry - Quality Control**

**Batch BFJ0837 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit    | Units      | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|--------------------|------------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0837-BLK1)</b>     |        |                    |            |             |   |      |             |      |           |       |
|                                 |        |                    |            |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 10:29 |      |             |      |           |       |
| Alkalinity, Total               | ND     | 1.00               | mg/L CaCO3 |             |   |      |             |      |           | U     |
| <b>Duplicate (BFJ0837-DUP1)</b> |        |                    |            |             |   |      |             |      |           |       |
|                                 |        | Source: 17J0505-02 |            |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 10:29 |      |             |      |           |       |
| Alkalinity, Total               | 510    | 1.00               | mg/L CaCO3 |             | 509   |      |             | 0.20 | 20        |       |
| <b>Reference (BFJ0837-SRM1)</b> |        |                    |            |             |   |      |             |      |           |       |
|                                 |        |                    |            |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 10:29 |      |             |      |           |       |
| Alkalinity, Total               | 105    | 1.00               | mg/L CaCO3 | 108         |   | 97.7 | 0-200       |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 13:31

**Wet Chemistry - Quality Control**

**Batch BFJ0849 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0849-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 13:02 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFJ0849-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 13:02 |      |             |      |           |       |
| Dissolved Solids                | 503    | 5.0                       | mg/L  | 500         |   | 101  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0849-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17J0505-02</b> |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 13:02 |      |             |      |           |       |
| Dissolved Solids                | 662    | 10.0                      | mg/L  |             | 648   |      |             | 2.14 | 20        |       |



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**Reported:**  
20-Nov-2017 13:31

**Wet Chemistry - Quality Control**

**Batch BFK0300 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte                   | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-------------------------------------|--------|---|-------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0300-BLK1)</b>         |        | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 20:31 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50  | mg/L  |   |               |      |             |      |           | U     |
| <b>LCS (BFK0300-BS1)</b>            |        | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 20:50 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 20.9   | 0.50  | mg/L  | 20.0  |               | 104  | 90-110      |      |           |       |
| <b>Duplicate (BFK0300-DUP1)</b>     |        | <b>Source: 17J0505-02</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 12-Nov-2017 01:27 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 15.0   | 1.00  | mg/L  |   | 15.2          |      |             | 1.19 | 20        | D     |
| <b>Matrix Spike (BFK0300-MS4)</b>   |        | <b>Source: 17J0505-02</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 16-Nov-2017 18:04 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 34.8   | 1.00  | mg/L  | 20.0  | 15.2          | 97.9 | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.





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Reported:  
20-Nov-2017 13:31

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Arsenic                           | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |



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Reported:  
20-Nov-2017 13:31

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Chloromethane                         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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Reported:  
20-Nov-2017 13:31

|                             |                                 |
|-----------------------------|---------------------------------|
| Dibromochloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |



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**Reported:**  
20-Nov-2017 13:31

Alkalinity, Total

DoD-ELAP,WADOE,WA-DW,NELAP

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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20-Nov-2017 13:31

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



20 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0529

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17J0529**      Turn-around Requested: **Normal**

ARI Client Company: **Pioneer Technologies**      Phone: **360-570-1700**

Client Contact: **Troy Bussey (busseyt@uspioneer.com)**

Client Project Name: **Arkema FS DIG Inv**      Samplers: **D Cooper 206-660-3466**

Client Project #: **79227**      T Dreher / L Kerner / D Pickering

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98158  
 206-695-6200 206-695-6201 (fax)



Date: **10-27-17**

Page: **1** of **2**

No. of Coolers: **1**

Cooler Temps: **2**

Analysis Requested

Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na, EPA 6010C

Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite, EPA 300.0

Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320

Dissolved TDS SM 2540 C/EPA 160.1

Dissolved DOC SM 5310 B

| Sample ID             | Date     | Time | Matrix | No. Containers | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na, EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite, EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B | Notes/Comments                              |
|-----------------------|----------|------|--------|----------------|--|--|--|--|---|--|-----------------------------------|-------------------------|---|
| GW-711-1-102717       | 10-27-17 | 845  | Water  | 7              | X  | X  | X  | X  | X   | X  | X                                 | X                       | All dissolved samples field filtered 0.45µM |
| GW-711-1-102717-(20)  |          | 845  |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-711-1-102717-(017) |          | 855  |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-711-1-102717-(217) |          | 855  |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-713-2-102717       |          | 850  |        | 7              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-713-2-102717-(20)  |          | 850  |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-841-1-102717       |          | 950  |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-841-1-102717-(20)  |          | 950  |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-761-2-102717       |          | 1015 |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-761-2-102717-(20)  |          | 1015 |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |
| GW-761-1-102717       |          | 1115 |        | 4              | X  | X  | X  | X  | X   | X  | X                                 | X                       | MS/MSD                                      |

Relinquished by: *[Signature]* (Signature)      Received by: *[Signature]* (Signature)

Printed Name: **Brandon Fisk**      Printed Name: **Brandon Fisk**

Company: **ARI**      Company: **ARI**

Date & Time: **10/27/17 1540**      Date & Time: **10/27/17 1540**

Comments/Special Instructions

Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: **10-27-17**  
 Page: **2** of **2**  
 No. of Coolers: **2**  
 Cooler Temps:

Analysis Requested

| Analysis Requested   | Notes/Comments                              |
|--|---|
| Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A<br>Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A<br>Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A<br>Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na<br>EPA 6010C<br>Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate<br>EPA 300.0<br>Dissolved Alkalinity as Carbonate and Bicarbonate<br>EPA 2320<br>Dissolved TDS<br>SM 2540 C/EPA 160.1<br>Dissolved DOC<br>SM 5310 B | All dissolved samples field filtered 0.45um |

Turn-around Requested: **Normal**  
 ARI Assigned Number: **1710529**  
 ARI Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kemer / D Pickering**

| Sample ID                         | Date     | Time            | Matrix | No. Containers | Relinquished by (Signature) | Relinquished by (Printed Name) | Relinquished by (Signature) | Relinquished by (Printed Name) | Received by (Signature) | Received by (Printed Name) |
|-----------------------------------|----------|-----------------|--------|----------------|-----------------------------|--------------------------------|-----------------------------|--------------------------------|-------------------------|----------------------------|
| GW-761-1-102717-(20)              | 10-27-17 | 1115            | water  | 4              | [Signature]                 | Brandon Fick                   | [Signature]                 | Brandon Fick                   | [Signature]             | Brandon Fick               |
| GW-862-1-102717                   |          | 1100            |        |                |                             |                                |                             |                                |                         |                            |
| GW-862-1-102717-(20)              |          | 1100            |        |                |                             |                                |                             |                                |                         |                            |
| GW-863-2-102717                   |          | 1150            |        |                |                             |                                |                             |                                |                         |                            |
| GW-863-2-102717-(20)              |          | 1150            |        |                |                             |                                |                             |                                |                         |                            |
| GW-8F2-2R-102717                  |          | 1210            |        |                |                             |                                |                             |                                |                         |                            |
| GW-8F2-2R-102717-(20)             |          | 1210            |        |                |                             |                                |                             |                                |                         |                            |
| <del>GW-13100-2-102717</del>      |          | <del>1300</del> |        | <del>3</del>   |                             |                                |                             |                                |                         |                            |
| <del>GW-13100-2-102717-(20)</del> |          | <del>1300</del> |        | <del>3</del>   |                             |                                |                             |                                |                         |                            |
| GW-13100-1-102717                 |          | 1320            |        | 3              |                             |                                |                             |                                |                         |                            |
| GW-13100-1-102717-(20)            |          | 1370            |        | 3              | [Signature]                 | Luhe Kerne                     | [Signature]                 | Luhe Kerne                     | [Signature]             | Luhe Kerne                 |

Comments/Special Instructions: Submit EDD to PIONEER using PIONEER EDD format 311 to Port of Tacoma #0#79227

Relinquished by (Signature): [Signature]  
 Relinquished by (Printed Name): Luhe Kerne  
 Relinquished by (Signature): [Signature]  
 Relinquished by (Printed Name): Brandon Fick  
 Received by (Signature): [Signature]  
 Received by (Printed Name): Brandon Fick  
 Company: ARI  
 Date & Time: 10/27/17 1540

**imits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**ample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





WORK ORDER

17J0529

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: 79227

Preservation Confirmation

| Container ID    | Container Type                       | pH      |
|-----------------|--------------------------------------|---------|
| 17J0529-01 A    | HDPE NM, 1000 mL, 1:1 HNO3           | L2 pass |
| 17J0529-01 B    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 C Sm | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 D    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 E    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 F    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 G    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-02 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-02 B    | Large OJ, 1000 mL FF                 |         |
| 17J0529-02 C    | Small OJ, 500 mL FF                  |         |
| 17J0529-02 D    | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-03 A    | HDPE NM, 1000 mL, 1:1 HNO3           | L2 pass |
| 17J0529-03 B    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-03 C    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-03 D    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-04 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-04 B    | Large OJ, 1000 mL FF                 |         |
| 17J0529-04 C    | Small OJ, 500 mL FF                  |         |
| 17J0529-04 D    | Glass NM, Amber, 250 mL, 9N H2SO4 F  | L2 pass |
| 17J0529-05 A    | HDPE NM, 1000 mL, 1:1 HNO3           | L2 pass |
| 17J0529-05 B Sm | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 C Sm | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 D pb | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 E lg | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 F Sm | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 G lg | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-06 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-06 B    | Large OJ, 1000 mL FF                 |         |
| 17J0529-06 C    | Small OJ, 500 mL FF                  |         |
| 17J0529-06 D    | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-07 A    | HDPE NM, 1000 mL, 1:1 HNO3           | L2 fail |



WORK ORDER

17J0529

|  |                                      |                                    |                 |
|--|--------------------------------------|------------------------------------|-----------------|
| Client: Pioneer Technologies Corporation                 |                                      | Project Manager: Amanda Volgardsen |                 |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                      | Project Number: 79227              |                 |
| 17J0529-07 B   | pb VOA Vial, Clear, 40 mL, HCL       |                                    |                 |
| 17J0529-07 C   | lg VOA Vial, Clear, 40 mL, HCL       |                                    |                 |
| 17J0529-07 D   | lg VOA Vial, Clear, 40 mL, HCL       |                                    |                 |
| 17J0529-08 A   | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | 72                                 | fail            |
| 17J0529-08 B   | Large OJ, 1000 mL FF                 |                                    |                 |
| 17J0529-08 C   | Small OJ, 500 mL FF                  |                                    |                 |
| 17J0529-08 D   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2                                 | pass            |
| 17J0529-09 A   | HDPE NM, 1000 mL, 1:1 HNO3           | 72                                 | fail            |
| 17J0529-09 B   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |
| 17J0529-09 C   | lg VOA Vial, Clear, 40 mL, HCL       |                                    |                 |
| 17J0529-09 D   | pb VOA Vial, Clear, 40 mL, HCL       |                                    |                 |
| 17J0529-10 A   | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | 72                                 | fail            |
| 17J0529-10 B   | Large OJ, 1000 mL FF                 |                                    |                 |
| 17J0529-10 C   | Small OJ, 500 mL FF                  |                                    |                 |
| 17J0529-10 D   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2                                 | pass            |
| 17J0529-11 A   | HDPE NM, 1000 mL, 1:1 HNO3           | L2                                 | pass            |
| 17J0529-11 B   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |
| 17J0529-11 C   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |
| 17J0529-11 D   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |
| 17J0529-12 A   | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2                                 | pass            |
| 17J0529-12 B   | Large OJ, 1000 mL FF                 |                                    |                 |
| 17J0529-12 C   | Small OJ, 500 mL FF                  |                                    |                 |
| 17J0529-12 D   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2                                 | pass            |
| 17J0529-13 A   | HDPE NM, 1000 mL, 1:1 HNO3           | <del>L2</del>                      | pass SF 72 fail |
| 17J0529-13 B   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |
| 17J0529-13 C   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |
| 17J0529-13 D   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |
| 17J0529-14 A   | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | 72                                 | fail            |
| 17J0529-14 B   | Large OJ, 1000 mL FF                 |                                    |                 |
| 17J0529-14 C   | Small OJ, 500 mL FF                  |                                    |                 |
| 17J0529-14 D   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2                                 | pass            |
| 17J0529-15 A   | HDPE NM, 1000 mL, 1:1 HNO3           | 72                                 | fail            |
| 17J0529-15 B   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |
| 17J0529-15 C   | VOA Vial, Clear, 40 mL, HCL          |                                    |                 |





WORK ORDER

17J0529

|   |                                      |   |
|---|--------------------------------------|---|
| <b>Client: Pioneer Technologies Corporation</b>                 |                                      | <b>Project Manager: Amanda Volgardsen</b> |
| <b>Project: Port of Tacoma Arkema- FS Data Gap Investigatio</b> |                                      | <b>Project Number: 79227</b>              |
| 17J0529-15 D  | sm VOA Vial, Clear, 40 mL, HCL       |   |
| 17J0529-16 A  | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | >> Fail                                   |
| 17J0529-16 B  | Large OJ, 1000 mL FF                 |   |
| 17J0529-16 C  | Small OJ, 500 mL FF                  |   |
| 17J0529-16 D  | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass                                   |
| 17J0529-17 A  | HDPE NM, 1000 mL, 1:1 HNO3           | >> fail                                   |
| 17J0529-17 B  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17J0529-17 C  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17J0529-17 D  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17J0529-18 A  | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | >> fail                                   |
| 17J0529-18 B  | Large OJ, 1000 mL FF                 |   |
| 17J0529-18 C  | Small OJ, 500 mL FF                  |   |
| 17J0529-18 D  | Glass NM, Amber, 250 mL, 9N H2SO4 FF | >> fail                                   |
| 17J0529-19 A  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17J0529-19 B  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17J0529-19 C  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17J0529-20 A  | Large OJ, 1000 mL FF                 |   |
| 17J0529-20 B  | Small OJ, 500 mL FF                  |   |
| 17J0529-20 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass                                   |

SF  
\_\_\_\_\_  
Preservation Confirmed By

10/27/17  
\_\_\_\_\_  
Date



# Cooler Receipt Form

ARI Client: Pioneer

Project Name: Arkemq

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17J0529

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time: 8.3 10.9

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 17002565

Cooler Accepted by: BF Date: 10/27/17 Time: 1540

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO

Were all VOC vials free of air bubbles? ..... NA YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI: \_\_\_\_\_ NA

Was Sample Split by ARI:  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: SF Date: 10/27/17 Time: 1741

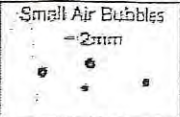
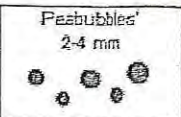
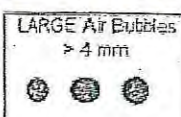
**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

air bubbles on pres sheet

By: SF Date: 10/27/17

|   |   |   |                                 |
|---|---|---|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|   |   |   | Peabubbles → "pb" (2 to < 4 mm) |
|   |   |   | Large → "lg" (4 to < 6 mm)      |
|   |   |   | Headspace → "hs" (> 6 mm)       |







Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID               | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-------------------------|---------------|--------|-------------------|-------------------|
| GW-7I1-1-102717         | 17J0529-01    | Water  | 27-Oct-2017 08:45 | 27-Oct-2017 15:40 |
| GW-7I1-1-102717-(20)    | 17J0529-02    | Water  | 27-Oct-2017 08:45 | 27-Oct-2017 15:40 |
| GW-7I1-1-102717-(01)    | 17J0529-03    | Water  | 27-Oct-2017 08:55 | 27-Oct-2017 15:40 |
| GW-7I1-1-102717-(21)    | 17J0529-04    | Water  | 27-Oct-2017 08:55 | 27-Oct-2017 15:40 |
| GW-7I3-2-102717         | 17J0529-05    | Water  | 27-Oct-2017 08:50 | 27-Oct-2017 15:40 |
| GW-7I3-2-102717-(20)    | 17J0529-06    | Water  | 27-Oct-2017 08:50 | 27-Oct-2017 15:40 |
| GW-8H1-1-102717         | 17J0529-07    | Water  | 27-Oct-2017 09:50 | 27-Oct-2017 15:40 |
| GW-8H1-1-102717-(20)    | 17J0529-08    | Water  | 27-Oct-2017 09:50 | 27-Oct-2017 15:40 |
| GW-7G1-2-102717         | 17J0529-09    | Water  | 27-Oct-2017 10:15 | 27-Oct-2017 15:40 |
| GW-7G1-2-102717-(20)    | 17J0529-10    | Water  | 27-Oct-2017 10:15 | 27-Oct-2017 15:40 |
| GW-7G1-1-102717         | 17J0529-11    | Water  | 27-Oct-2017 11:15 | 27-Oct-2017 15:40 |
| GW-7G1-1-102717-(20)    | 17J0529-12    | Water  | 27-Oct-2017 11:15 | 27-Oct-2017 15:40 |
| GW-8G2-1-102717         | 17J0529-13    | Water  | 27-Oct-2017 11:00 | 27-Oct-2017 15:40 |
| GW-8G2-1-102717-(20)    | 17J0529-14    | Water  | 27-Oct-2017 11:00 | 27-Oct-2017 15:40 |
| GW-8G3-2-102717         | 17J0529-15    | Water  | 27-Oct-2017 11:50 | 27-Oct-2017 15:40 |
| GW-8G3-2-102717-(20)    | 17J0529-16    | Water  | 27-Oct-2017 11:50 | 27-Oct-2017 15:40 |
| GW-8F2-2R-102717        | 17J0529-17    | Water  | 27-Oct-2017 12:10 | 27-Oct-2017 15:40 |
| GW-8F2-2R-102717-(20)   | 17J0529-18    | Water  | 27-Oct-2017 12:10 | 27-Oct-2017 15:40 |
| GW-131+00-1-102717      | 17J0529-19    | Water  | 27-Oct-2017 13:20 | 27-Oct-2017 15:40 |
| GW-131+00-1-102717-(20) | 17J0529-20    | Water  | 27-Oct-2017 13:20 | 27-Oct-2017 15:40 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 27, 2017 under ARI workorder 17J0529. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

A matrix spike and matrix spike duplicate were prepared in conjunction with sample GW-711-1-102717. The matrix spike/matrix spike duplicate percent recoveries and RPD were within QC limits.

A matrix spike and matrix spike duplicate were prepared in conjunction with sample GW-713-2-102717. The matrix spike/matrix spike duplicate percent recoveries and RPD were within QC limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-711-1-102717. The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-713-2-102717. The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-711-1-102717-(20). The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-713-2-102717-(20). The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

#### **Total and Dissolved Metals - EPA Method 6020A**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFK0202 has Nickel detected below the reporting limit, but above the method detection limit. The Nickel has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-711-1-102717. The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-713-2-102717. The matrix spike/matrix spike duplicate percent recoveries and RPD were within QC limits. The duplicate has a Lead concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to +/- the reporting limit instead of 20% of the RPD. The Lead has been flagged with an "L" qualifier on the duplicate. No further corrective action was taken.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-711-1-102717-(20). The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-713-2-102717-(20). The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFK0238 has Iron and Sodium detected below the reporting limits, but above the method detection limits. The Iron and Sodium have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

On all of the QC Sodium has a concentration that exceeds the upper calibration limit, and has been flagged with an "E" qualifier.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-711-1-102717. The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-713-2-102717. The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-711-1-102717-(20). The duplicate RPD were within QC limits. The matrix spike and matrix spike duplicate have natural concentrations of Calcium and Magnesium that are so much greater than the concentrations spiked that an accurate determination of spike recovery is not possible. This is due to the salt content in the samples. These metals have been flagged with an "HC" qualifier on the matrix spike/matrix spike duplicate. No further corrective action was taken.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-713-2-102717-(20). The duplicate RPD were within QC limits. The matrix spike and matrix spike duplicate have a natural concentration of Sodium that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. This is due to the high salt content in the samples. The Sodium has been flagged with an "HC" qualifier on the matrix spike/matrix spike duplicate. No further corrective action was taken.

#### **Anions - EPA Method 300.0**

The samples were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-711-1-102717-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-713-2-102717-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits. The matrix spike has a Bromide concentration that exceeds the upper calibration limit, and has been flagged with an "E" qualifier. No further corrective action was taken.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

Due to the basic pH sample GW-8F2-2R-102717-(20) was not analyzed for Alkalinity.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

A duplicate was prepared in conjunction with sampe GW-711-1-102717-(20). The duplicate RPD was within QC limits.

A duplicate was prepared in conjunction with sampe GW-713-2-102717-(20). The duplicate RPD was within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sampe GW-711-1-102717-(20). The duplicate RPD was within QC limits.

A duplicate was prepared in conjunction with sampe GW-713-2-102717-(20). The duplicate RPD was within QC limits.

**Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample GW-711-1-102717-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-713-2-102717-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.



WORK ORDER

17J0529

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: 79227

Preservation Confirmation

| Container ID    | Container Type                       | pH      |
|-----------------|--------------------------------------|---------|
| 17J0529-01 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-01 B    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 C Sm | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 D    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 E    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 F    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-01 G    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-02 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-02 B    | Large OJ, 1000 mL FF                 |         |
| 17J0529-02 C    | Small OJ, 500 mL FF                  |         |
| 17J0529-02 D    | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-03 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-03 B    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-03 C    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-03 D    | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-04 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-04 B    | Large OJ, 1000 mL FF                 |         |
| 17J0529-04 C    | Small OJ, 500 mL FF                  |         |
| 17J0529-04 D    | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-05 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-05 B Sm | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 C sm | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 D pb | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 E lg | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 F sm | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-05 G lg | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-06 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-06 B    | Large OJ, 1000 mL FF                 |         |
| 17J0529-06 C    | Small OJ, 500 mL FF                  |         |
| 17J0529-06 D    | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-07 A    | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 fail |



WORK ORDER

17J0529

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: 79227

|              |                                      |         |
|--------------|--------------------------------------|---------|
| 17J0529-07 B | pb VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0529-07 C | lg VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0529-07 D | lg VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0529-08 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | >2 fail |
| 17J0529-08 B | Large OJ, 1000 mL FF                 |         |
| 17J0529-08 C | Small OJ, 500 mL FF                  |         |
| 17J0529-08 D | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-09 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | >2 fail |
| 17J0529-09 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-09 C | lg VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0529-09 D | pb VOA Vial, Clear, 40 mL, HCL       |         |
| 17J0529-10 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | >2 fail |
| 17J0529-10 B | Large OJ, 1000 mL FF                 |         |
| 17J0529-10 C | Small OJ, 500 mL FF                  |         |
| 17J0529-10 D | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-11 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-11 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-11 C | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-11 D | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-12 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | L2 pass |
| 17J0529-12 B | Large OJ, 1000 mL FF                 |         |
| 17J0529-12 C | Small OJ, 500 mL FF                  |         |
| 17J0529-12 D | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-13 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | >2 fail |
| 17J0529-13 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-13 C | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-13 D | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-14 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | >2 fail |
| 17J0529-14 B | Large OJ, 1000 mL FF                 |         |
| 17J0529-14 C | Small OJ, 500 mL FF                  |         |
| 17J0529-14 D | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17J0529-15 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)      | >2 fail |
| 17J0529-15 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17J0529-15 C | VOA Vial, Clear, 40 mL, HCL          |         |





WORK ORDER

17J0529

|  |                                    |
|--|------------------------------------|
| Client: Pioneer Technologies Corporation                 | Project Manager: Amanda Volgardsen |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio | Project Number: 79227              |

|              |                                   |    |  |
|--------------|-----------------------------------|----|--|
| 17J0529-15 D | Sm VOA Vial, Clear, 40 mL, HCL    |    |  |
| 17J0529-16 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)   |    | >2 fail  |
| 17J0529-16 B | Large OJ, 1000 mL                 | FF |  |
| 17J0529-16 C | Small OJ, 500 mL                  | FF |  |
| 17J0529-16 D | Glass NM, Amber, 250 mL, 9N H2SO4 | FF | <2 pass  |
| 17J0529-17 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)   |    | >2 fail  |
| 17J0529-17 B | 1g VOA Vial, Clear, 40 mL, HCL    |    |  |
| 17J0529-17 C | 1g VOA Vial, Clear, 40 mL, HCL    |    |  |
| 17J0529-17 D | VOA Vial, Clear, 40 mL, HCL       |    |  |
| 17J0529-18 A | HDPE NM, 1000 mL, 1:1 HNO3 (FF)   |    | >2 fail  |
| 17J0529-18 B | Large OJ, 1000 mL                 | FF |  |
| 17J0529-18 C | Small OJ, 500 mL                  | FF |  |
| 17J0529-18 D | Glass NM, Amber, 250 mL, 9N H2SO4 | FF | >2 fail  |
| 17J0529-19 A | VOA Vial, Clear, 40 mL, HCL       |    | preserved to pH < 2<br>w/ 1 mL 7N H2SO4<br>RM 10/27/17 |
| 17J0529-19 B | VOA Vial, Clear, 40 mL, HCL       |    |  |
| 17J0529-19 C | VOA Vial, Clear, 40 mL, HCL       |    |  |
| 17J0529-20 A | Large OJ, 1000 mL                 | FF |  |
| 17J0529-20 B | Small OJ, 500 mL                  | FF |  |
| 17J0529-20 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF | <2 pass  |

SF  
\_\_\_\_\_  
Preservation Confirmed By

10/27/17  
\_\_\_\_\_  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-711-1-102717**  
**17J0529-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 08:45  
Analyzed: 02-Nov-2017 14:22

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 115   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.4  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 86.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102   | %     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-711-1-102717**

**17J0529-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 08:45  
Analyzed: 10-Nov-2017 01:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-711-1-102717**

**17J0529-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED

Sampled: 10/27/2017 08:45

Instrument: ICPMS2

Analyzed: 10-Nov-2017 01:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.752</b> | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.615</b> | ug/L  |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
20-Nov-2017 14:27

**GW-711-1-102717**

**17J0529-01 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 08:45  
Analyzed: 08-Nov-2017 15:24

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 08:45  
Analyzed: 10-Nov-2017 13:02

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 47.9   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 4.76   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 60.7   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 1.64   | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 15.0   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 16.4   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | 132    | mg/L  |       |



Pioneer Technologies Corporation  
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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 08:45  
Analyzed: 13-Nov-2017 18:02

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 08:45  
Analyzed: 10-Nov-2017 23:40

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.552</b> | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.608</b> | ug/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 08:45  
Analyzed: 08-Nov-2017 16:10

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 08:45  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 100 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>671</b> | mg/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 08:45  
Analyzed: 28-Oct-2017 12:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.166</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.38</b> | mg-P/L |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/27/2017 08:45

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 434    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 434    | mg/L CaCO3 |       |





Pioneer Technologies Corporation  
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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 08:45  
Analyzed: 12-Nov-2017 02:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 9.17   | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 08:45  
Analyzed: 29-Oct-2017 03:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 2        | 0.200           | <b>2.45</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2        | 0.200           | <b>2.62</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(20)**  
**17J0529-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 08:45  
Analyzed: 05-Nov-2017 01:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>153</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(01)**  
**17J0529-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 08:55  
Analyzed: 02-Nov-2017 14:42

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 116   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 86.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(01)**  
**17J0529-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 08:55  
Analyzed: 13-Nov-2017 18:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(01)**  
**17J0529-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 08:55  
Analyzed: 10-Nov-2017 02:01

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.734</b> | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.543</b> | ug/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(01)**  
**17J0529-03 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 08:55  
Analyzed: 08-Nov-2017 15:30

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

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Reported:  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 08:55  
Analyzed: 10-Nov-2017 14:09

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238 Sample Size: 25 mL  
Prepared: 09-Nov-2017 Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0168</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>50.3</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>4.83</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>63.2</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>1.69</b>   | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>15.9</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>17.0</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>135</b>    | mg/L  |       |





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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 08:55  
Analyzed: 13-Nov-2017 18:18

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 08:55  
Analyzed: 10-Nov-2017 23:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.577</b> | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.601</b> | ug/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 08:55  
Analyzed: 08-Nov-2017 16:17

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175 Sample Size: 20 mL  
Prepared: 07-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 08:55  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 75 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>675</b> | mg/L  |       |



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Reported:  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 08:55  
Analyzed: 28-Oct-2017 13:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.166</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>2.44</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.32</b> | mg-P/L |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/27/2017 08:55

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 425    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 425    | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 08:55  
Analyzed: 11-Nov-2017 09:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>9.41</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 08:55  
Analyzed: 29-Oct-2017 04:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 2        | 0.200           | <b>3.87</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I1-1-102717-(21)**  
**17J0529-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 08:55  
Analyzed: 05-Nov-2017 03:00

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>146</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-713-2-102717**  
**17J0529-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 08:50  
Analyzed: 02-Nov-2017 15:03

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 117   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 89.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 106   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
20-Nov-2017 14:27

**GW-713-2-102717**

**17J0529-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 08:50  
Analyzed: 11-Nov-2017 02:11

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.124</b> | ug/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
20-Nov-2017 14:27

**GW-713-2-102717**

**17J0529-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 08:50  
Analyzed: 10-Nov-2017 01:23

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>3.29</b>  | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>0.877</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.903</b> | ug/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-713-2-102717**

**17J0529-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 08:50  
Analyzed: 08-Nov-2017 15:32

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 08:50  
Analyzed: 10-Nov-2017 13:23

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | 62.3   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | 9.60   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | 45.2   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | 1.81   | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | 33.6   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | 24.4   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | 478    | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 08:50  
Analyzed: 11-Nov-2017 01:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 08:50  
Analyzed: 11-Nov-2017 01:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.984</b> | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.549</b> | ug/L  |       |





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Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 08:50  
Analyzed: 08-Nov-2017 16:18

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 08:50  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 50 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1540</b> | mg/L  |       |



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Reported:  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 08:50  
Analyzed: 28-Oct-2017 13:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.616</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>1.05</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>1.85</b> | mg-P/L |       |

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | <b>0.615</b> | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/27/2017 08:50

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 770    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 770    | mg/L CaCO3 |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 08:50  
Analyzed: 11-Nov-2017 09:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>19.0</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7I3-2-102717-(20)**  
**17J0529-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 08:50  
Analyzed: 05-Nov-2017 03:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | 447    | mg/L  | D     |



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Reported:  
20-Nov-2017 14:27

**GW-8H1-1-102717**  
**17J0529-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 09:50  
Analyzed: 02-Nov-2017 15:26

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 1 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 116   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 85.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717**  
**17J0529-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 09:50  
Analyzed: 10-Nov-2017 00:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |





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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717**  
**17J0529-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 09:50  
Analyzed: 10-Nov-2017 00:53

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 10       | 0.220           | 2.00            | <b>14.2</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 10       | 3.40            | 5.00            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 10       | 0.500           | 5.00            | <b>5.70</b> | ug/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717**  
**17J0529-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 09:50  
Analyzed: 08-Nov-2017 15:42

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174 Sample Size: 20 mL  
Prepared: 07-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

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Reported:  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 09:50  
Analyzed: 10-Nov-2017 14:18

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | <b>0.412</b> | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>113</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 20       | 0.0260          | 1.00            | <b>16.1</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>92.7</b>  | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 20       | 0.0068          | 0.0200          | <b>0.885</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>129</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>21.4</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>6030</b>  | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 09:50  
Analyzed: 11-Nov-2017 00:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 10       | 0.680           | 1.00            | ND     | ug/L  | U     |



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Reported:  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 09:50  
Analyzed: 11-Nov-2017 00:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | 12.9   | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 10       | 3.40            | 5.00            | ND     | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 10       | 0.500           | 5.00            | 5.40   | ug/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 09:50  
Analyzed: 08-Nov-2017 16:29

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175 Sample Size: 20 mL  
Prepared: 07-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 09:50  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>14600</b> | mg/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 09:50  
Analyzed: 28-Oct-2017 15:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |





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Reported:  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/27/2017 09:50

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 2170   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 2170   | mg/L CaCO3 |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 09:50  
Analyzed: 29-Oct-2017 04:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>4.53</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>2.40</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>11.3</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>1.06</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08RE1 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 09:50  
Analyzed: 12-Nov-2017 14:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>110</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8H1-1-102717-(20)**  
**17J0529-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 09:50  
Analyzed: 05-Nov-2017 05:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>8940</b> | mg/L  | D     |



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Reported:  
20-Nov-2017 14:27

**GW-7G1-2-102717**  
**17J0529-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 10:15  
Analyzed: 02-Nov-2017 15:46

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 122   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 88.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 106   | %     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717**  
**17J0529-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 10:15  
Analyzed: 10-Nov-2017 00:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717**  
**17J0529-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 10:15  
Analyzed: 10-Nov-2017 00:10

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2.70</b> | ug/L  | J, D  |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717**  
**17J0529-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 10:15  
Analyzed: 08-Nov-2017 15:44

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174 Sample Size: 20 mL  
Prepared: 07-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Reported:  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 10:15  
Analyzed: 10-Nov-2017 14:22

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | 219    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 20       | 0.0260          | 1.00            | 13.4   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | 539    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 20       | 0.0068          | 0.0200          | 0.787  | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | 246    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | 20.4   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | 5690   | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 10:15  
Analyzed: 11-Nov-2017 00:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 10:15  
Analyzed: 11-Nov-2017 00:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1.40</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 10:15  
Analyzed: 08-Nov-2017 16:30

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 10:15  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>15600</b> | mg/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 10:15  
Analyzed: 28-Oct-2017 15:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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Reported:  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/27/2017 10:15  
Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1580</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1580</b> | mg/L CaCO3 |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 10:15  
Analyzed: 11-Nov-2017 11:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>29.6</b> | mg/L  | D     |





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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 10:15  
Analyzed: 29-Oct-2017 05:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>14.7</b> | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>9.78</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-2-102717-(20)**  
**17J0529-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 10:15  
Analyzed: 05-Nov-2017 05:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>10000</b> | mg/L  | D     |



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Reported:  
20-Nov-2017 14:27

**GW-7G1-1-102717**  
**17J0529-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 11:15  
Analyzed: 02-Nov-2017 16:06

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 10 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.05</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.33</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.12</b> | ug/L  | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 118   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.7  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 85.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 104   | %     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717**  
**17J0529-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 11:15  
Analyzed: 13-Nov-2017 18:33

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 2        | 0.136           | 0.200           | <b>1.20</b> | ug/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717**  
**17J0529-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 11:15  
Analyzed: 10-Nov-2017 02:06

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>38.1</b> | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>3.13</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>6.05</b> | ug/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717**  
**17J0529-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 11:15  
Analyzed: 08-Nov-2017 15:46

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174 Sample Size: 20 mL  
Prepared: 07-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 11:15  
Analyzed: 10-Nov-2017 14:13

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0144</b> | mg/L  | J     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>32.3</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0958</b> | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>78.2</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0490</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>10.5</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>15.9</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>591</b>    | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 11:15  
Analyzed: 13-Nov-2017 18:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 11:15  
Analyzed: 11-Nov-2017 00:05

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>40.7</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>1.37</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>5.97</b> | ug/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 11:15  
Analyzed: 08-Nov-2017 16:32

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 11:15  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 50 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1750</b> | mg/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:15  
Analyzed: 28-Oct-2017 15:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.189</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.732</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.40</b> | mg-P/L |       |



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Reported:  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/27/2017 11:15  
Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 448    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 123    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 571    | mg/L CaCO3 |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 11:15  
Analyzed: 11-Nov-2017 11:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>16.4</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:15  
Analyzed: 29-Oct-2017 05:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>119</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-7G1-1-102717-(20)**  
**17J0529-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:15  
Analyzed: 05-Nov-2017 05:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>660</b> | mg/L  | D     |





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Reported:  
20-Nov-2017 14:27

**GW-8G2-1-102717**  
**17J0529-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 11:00  
Analyzed: 02-Nov-2017 16:29

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0042 Sample Size: 1 mL  
Prepared: 01-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 115 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.6 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 82.4 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103 %  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717**  
**17J0529-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 11:00  
Analyzed: 10-Nov-2017 00:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717**  
**17J0529-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 11:00  
Analyzed: 10-Nov-2017 00:24

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>194</b>    | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>9.08</b>   | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.0920</b> | ug/L  | J     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717**  
**17J0529-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 11:00  
Analyzed: 08-Nov-2017 15:47

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 11:00  
Analyzed: 10-Nov-2017 14:31

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>6.87</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>0.162</b>  | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>4.14</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>0.0024</b> | mg/L  | J, D  |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>82.0</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>165</b>    | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>7850</b>   | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 11:00  
Analyzed: 11-Nov-2017 00:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 11:00  
Analyzed: 11-Nov-2017 00:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>272</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>11.0</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>48.0</b> | ug/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 11:00  
Analyzed: 08-Nov-2017 16:34

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result          | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | <b>0.000120</b> | mg/L  |       |





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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 11:00  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>18300</b> | mg/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:00  
Analyzed: 28-Oct-2017 16:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Reported:  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/27/2017 11:00

Instrument: Accumet AR60

Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 422    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | 1940   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 2360   | mg/L CaCO3 |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 11:00  
Analyzed: 11-Nov-2017 12:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>136</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:00  
Analyzed: 29-Oct-2017 05:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>7.46</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>2.30</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>5.72</b> | mg-P/L | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:00  
Analyzed: 05-Nov-2017 06:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>10400</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G2-1-102717-(20)**  
**17J0529-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:00  
Analyzed: 10-Nov-2017 10:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>487</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-8G3-2-102717**  
**17J0529-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 11:50  
Analyzed: 03-Nov-2017 14:14

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 1 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | 49.5     | ug/L   |       |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 109 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.4 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 83.6 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104 %  |       |





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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717**  
**17J0529-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 11:50  
Analyzed: 10-Nov-2017 00:20

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717**  
**17J0529-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 11:50  
Analyzed: 10-Nov-2017 00:20

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>69.4</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>0.354</b> | ug/L  | J     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>6.04</b>  | ug/L  | J, D  |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717**  
**17J0529-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 11:50  
Analyzed: 08-Nov-2017 15:49

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174 Sample Size: 20 mL  
Prepared: 07-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 11:50  
Analyzed: 10-Nov-2017 14:27

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>9.69</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>0.0733</b> | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>8.38</b>   | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>0.0019</b> | mg/L  | J, D  |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>146</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>33.8</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>8710</b>   | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 11:50  
Analyzed: 11-Nov-2017 00:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 11:50  
Analyzed: 11-Nov-2017 00:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>58.3</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>5.76</b> | ug/L  | J, D  |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 11:50  
Analyzed: 08-Nov-2017 16:35

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 11:50  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>19600</b> | mg/L  |       |





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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:50  
Analyzed: 28-Oct-2017 16:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/27/2017 11:50  
Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860  
Prepared: 30-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1480</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>744</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>2220</b> | mg/L CaCO3 |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 11:50  
Analyzed: 11-Nov-2017 12:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>85.0</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:50  
Analyzed: 29-Oct-2017 06:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>11.3</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>1.44</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>4.62</b> | mg-P/L | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:50  
Analyzed: 05-Nov-2017 06:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>11900</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8G3-2-102717-(20)**  
**17J0529-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 11:50  
Analyzed: 05-Nov-2017 07:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | 795    | mg/L  | D     |



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Reported:  
20-Nov-2017 14:27

**GW-8F2-2R-102717**  
**17J0529-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 12:10  
Analyzed: 03-Nov-2017 14:37

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 1 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | <b>2.99</b> | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 113   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 87.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 102   | %     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717**  
**17J0529-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 12:10  
Analyzed: 10-Nov-2017 00:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |





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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717**  
**17J0529-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 12:10  
Analyzed: 10-Nov-2017 00:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>31.7</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>23.3</b>  | ug/L  | D     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.478</b> | ug/L  | J     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717**  
**17J0529-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 12:10  
Analyzed: 08-Nov-2017 15:50

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0174 Sample Size: 20 mL  
Prepared: 07-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/27/2017 12:10  
Analyzed: 10-Nov-2017 14:36

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 20       | 0.170           | 1.00            | ND          | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 20       | 0.102           | 1.00            | <b>2.78</b> | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 20       | 0.0260          | 1.00            | <b>2.06</b> | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 20       | 0.320           | 1.00            | ND          | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 20       | 0.0068          | 0.0200          | ND          | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 20       | 1.04            | 10.0            | <b>112</b>  | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 20       | 0.104           | 1.20            | <b>83.5</b> | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 20       | 38.0            | 1000            | <b>8590</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/27/2017 12:10  
Analyzed: 11-Nov-2017 00:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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Reported:  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/27/2017 12:10  
Analyzed: 11-Nov-2017 00:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0170 Sample Size: 25 mL  
Prepared: 07-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>34.5</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>29.5</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>84.1</b> | ug/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/27/2017 12:10  
Analyzed: 08-Nov-2017 16:37

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0175  
Prepared: 07-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 12:10  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>21600</b> | mg/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 12:10  
Analyzed: 28-Oct-2017 16:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | 42.5   | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | 11.5   | mg-P/L | D     |





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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 12:10  
Analyzed: 11-Nov-2017 12:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 10       | 5.00            | <b>703</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 12:10  
Analyzed: 29-Oct-2017 07:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 100      | 10.0            | <b>179</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-8F2-2R-102717-(20)**  
**17J0529-18RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 12:10  
Analyzed: 05-Nov-2017 06:41

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>10900</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**GW-131+00-1-102717**  
**17J0529-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 13:20  
Analyzed: 03-Nov-2017 15:20

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|--|------------|----------|-----------------|-----------------|-------------|----------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L     | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L     | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L     | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L     | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 | <i>80-129 %</i> | <i>115</i>  | <i>%</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 | <i>80-120 %</i> | <i>93.1</i> | <i>%</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 | <i>80-120 %</i> | <i>86.2</i> | <i>%</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 | <i>80-120 %</i> | <i>105</i>  | <i>%</i> |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-131+00-1-102717-(20)**  
**17J0529-20 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: N/A

Sampled: 10/27/2017 13:20  
Analyzed: 30-Oct-2017 14:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0858 Sample Size: 50 mL  
Prepared: 30-Oct-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1700</b> | mg/L  |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-131+00-1-102717-(20)**  
**17J0529-20 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 13:20  
Analyzed: 28-Oct-2017 17:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822  
Prepared: 28-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | E, U  |



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**Reported:**  
20-Nov-2017 14:27

**GW-131+00-1-102717-(20)**  
**17J0529-20 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/27/2017 13:20  
Analyzed: 30-Oct-2017 14:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0860 Sample Size: 100 mL  
Prepared: 30-Oct-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 414    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 414    | mg/L CaCO3 |       |



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**Reported:**  
20-Nov-2017 14:27

**GW-131+00-1-102717-(20)**  
**17J0529-20 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 13:20  
Analyzed: 11-Nov-2017 14:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0300 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>3.74</b> | mg/L  | D     |





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**Reported:**  
20-Nov-2017 14:27

**GW-131+00-1-102717-(20)**  
**17J0529-20RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 13:20  
Analyzed: 29-Oct-2017 07:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>2.97</b> | mg/L  | D     |



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**Reported:**  
20-Nov-2017 14:27

**GW-131+00-1-102717-(20)**  
**17J0529-20RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 13:20  
Analyzed: 05-Nov-2017 07:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0822 Sample Size: 5 mL  
Prepared: 28-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>844</b> | mg/L  | D     |



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Reported:  
20-Nov-2017 14:27

### Volatile Organic Compounds - Quality Control

#### Batch BFK0042 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|--------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0042-BLK1)</b>              |        |                 |                    |       |             |   |      |             |      |           |       |
|  |        |                 |                    |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 09:24 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.08            |                    | ug/L  | 5.00        |   | 102  | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.79            |                    | ug/L  | 5.00        |   | 95.7 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.47            |                    | ug/L  | 5.00        |   | 89.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.12            |                    | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFK0042-BS1)</b>                 |        |                 |                    |       |             |   |      |             |      |           |       |
|  |        |                 |                    |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 08:03 |      |             |      |           |       |
| Vinyl Chloride                           | 10.4   | 0.06            | 0.20               | ug/L  | 10.0        |   | 104  | 66-133      |      |           |       |
| Chloroform                               | 9.77   | 0.03            | 0.20               | ug/L  | 10.0        |   | 97.7 | 80-122      |      |           |       |
| Trichloroethene                          | 9.80   | 0.05            | 0.20               | ug/L  | 10.0        |   | 98.0 | 80-120      |      |           |       |
| Tetrachloroethene                        | 9.61   | 0.05            | 0.20               | ug/L  | 10.0        |   | 96.1 | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.95            |                    | ug/L  | 5.00        |   | 99.0 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.62            |                    | ug/L  | 5.00        |   | 92.5 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.08            |                    | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.92            |                    | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.92            |                    | ug/L  | 5.00        |   | 98.3 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0042-BSD1)</b>            |        |                 |                    |       |             |   |      |             |      |           |       |
|  |        |                 |                    |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 08:44 |      |             |      |           |       |
| Vinyl Chloride                           | 10.6   | 0.06            | 0.20               | ug/L  | 10.0        |   | 106  | 66-133      | 1.67 | 30        |       |
| Chloroform                               | 10.5   | 0.03            | 0.20               | ug/L  | 10.0        |   | 105  | 80-122      | 6.96 | 30        |       |
| Trichloroethene                          | 10.1   | 0.05            | 0.20               | ug/L  | 10.0        |   | 101  | 80-120      | 3.03 | 30        |       |
| Tetrachloroethene                        | 10.2   | 0.05            | 0.20               | ug/L  | 10.0        |   | 102  | 80-120      | 5.61 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.80            |                    | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.56            |                    | ug/L  | 5.00        |   | 91.1 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.07            |                    | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.88            |                    | ug/L  | 5.00        |   | 97.6 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.90            |                    | ug/L  | 5.00        |   | 98.1 | 80-120      |      |           |       |
| <b>Matrix Spike (BFK0042-MS1)</b>        |        |                 |                    |       |             |   |      |             |      |           |       |
|  |        |                 | Source: 17J0529-01 |       |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 16:50 |      |             |      |           |       |
| Vinyl Chloride                           | 9.84   | 0.06            | 0.20               | ug/L  | 10.0        | ND  | 98.4 | 66-133      |      |           |       |
| Chloroform                               | 10.7   | 0.03            | 0.20               | ug/L  | 10.0        | ND  | 107  | 80-122      |      |           |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

### Volatile Organic Compounds - Quality Control

#### Batch BFK0042 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                 | Result | Detection Limit           | Reporting Limit | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|-----------------|-------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFK0042-MS1)</b> |        | <b>Source: 17J0529-01</b> |                 |       | Prepared: 02-Nov-2017 |               | Analyzed: 02-Nov-2017 16:50 |             |     |           |       |
| Trichloroethene                   | 10.2   | 0.05                      | 0.20            | ug/L  | 10.0                  | ND            | 102                         | 80-120      |     |           |       |
| Tetrachloroethene                 | 10.1   | 0.05                      | 0.20            | ug/L  | 10.0                  | ND            | 101                         | 80-120      |     |           |       |
| Surrogate: Dibromofluoromethane   |        | 5.07                      |                 | ug/L  | 5.00                  |               | 101                         | 80-120      |     |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 5.00                      |                 | ug/L  | 5.00                  | 5.77          | 100                         | 80-129      |     |           |       |
| Surrogate: Toluene-d8             |        | 5.12                      |                 | ug/L  | 5.00                  | 4.82          | 102                         | 80-120      |     |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.99                      |                 | ug/L  | 5.00                  | 4.34          | 99.9                        | 80-120      |     |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.88                      |                 | ug/L  | 5.00                  | 5.11          | 97.6                        | 80-120      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                           |      |      |                       |      |                             |        |  |  |  |
|-----------------------------------|------|---------------------------|------|------|-----------------------|------|-----------------------------|--------|--|--|--|
| <b>Matrix Spike (BFK0042-MS2)</b> |      | <b>Source: 17J0529-05</b> |      |      | Prepared: 02-Nov-2017 |      | Analyzed: 02-Nov-2017 17:30 |        |  |  |  |
| Vinyl Chloride                    | 10.2 | 0.06                      | 0.20 | ug/L | 10.0                  | ND   | 102                         | 66-133 |  |  |  |
| Chloroform                        | 10.2 | 0.03                      | 0.20 | ug/L | 10.0                  | ND   | 102                         | 80-122 |  |  |  |
| Trichloroethene                   | 9.88 | 0.05                      | 0.20 | ug/L | 10.0                  | ND   | 98.8                        | 80-120 |  |  |  |
| Tetrachloroethene                 | 9.52 | 0.05                      | 0.20 | ug/L | 10.0                  | ND   | 95.2                        | 80-120 |  |  |  |
| Surrogate: Dibromofluoromethane   |      | 5.16                      |      | ug/L | 5.00                  |      | 103                         | 80-120 |  |  |  |
| Surrogate: 1,2-Dichloroethane-d4  |      | 4.92                      |      | ug/L | 5.00                  | 5.84 | 98.4                        | 80-129 |  |  |  |
| Surrogate: Toluene-d8             |      | 5.10                      |      | ug/L | 5.00                  | 4.71 | 102                         | 80-120 |  |  |  |
| Surrogate: 4-Bromofluorobenzene   |      | 4.92                      |      | ug/L | 5.00                  | 4.47 | 98.3                        | 80-120 |  |  |  |
| Surrogate: 1,2-Dichlorobenzene-d4 |      | 4.92                      |      | ug/L | 5.00                  | 5.31 | 98.3                        | 80-120 |  |  |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|  |      |                           |      |      |                       |      |                             |        |      |    |  |
|--|------|---------------------------|------|------|-----------------------|------|-----------------------------|--------|------|----|--|
| <b>Matrix Spike Dup (BFK0042-MSD1)</b> |      | <b>Source: 17J0529-01</b> |      |      | Prepared: 02-Nov-2017 |      | Analyzed: 02-Nov-2017 17:10 |        |      |    |  |
| Vinyl Chloride                         | 10.3 | 0.06                      | 0.20 | ug/L | 10.0                  | ND   | 103                         | 66-133 | 4.78 | 30 |  |
| Chloroform                             | 10.5 | 0.03                      | 0.20 | ug/L | 10.0                  | ND   | 105                         | 80-122 | 1.09 | 30 |  |
| Trichloroethene                        | 9.92 | 0.05                      | 0.20 | ug/L | 10.0                  | ND   | 99.2                        | 80-120 | 2.84 | 30 |  |
| Tetrachloroethene                      | 9.87 | 0.05                      | 0.20 | ug/L | 10.0                  | ND   | 98.7                        | 80-120 | 2.70 | 30 |  |
| Surrogate: Dibromofluoromethane        |      | 5.12                      |      | ug/L | 5.00                  |      | 102                         | 80-120 |      |    |  |
| Surrogate: 1,2-Dichloroethane-d4       |      | 5.16                      |      | ug/L | 5.00                  | 5.77 | 103                         | 80-129 |      |    |  |
| Surrogate: Toluene-d8                  |      | 5.03                      |      | ug/L | 5.00                  | 4.82 | 101                         | 80-120 |      |    |  |
| Surrogate: 4-Bromofluorobenzene        |      | 5.00                      |      | ug/L | 5.00                  | 4.34 | 99.9                        | 80-120 |      |    |  |
| Surrogate: 1,2-Dichlorobenzene-d4      |      | 4.93                      |      | ug/L | 5.00                  | 5.11 | 98.5                        | 80-120 |      |    |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|  |  |                           |  |  |                       |  |                             |  |  |  |  |
|--|--|---------------------------|--|--|-----------------------|--|-----------------------------|--|--|--|--|
| <b>Matrix Spike Dup (BFK0042-MSD2)</b> |  | <b>Source: 17J0529-05</b> |  |  | Prepared: 02-Nov-2017 |  | Analyzed: 02-Nov-2017 17:51 |  |  |  |  |
|--|--|---------------------------|--|--|-----------------------|--|-----------------------------|--|--|--|--|



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Volatile Organic Compounds - Quality Control**

**Batch BFK0042 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                        | Result | Detection Limit           | Reporting Limit | Units                 | Spike Level | Source Result               | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|---------------------------|-----------------|-----------------------|-------------|-----------------------------|------|-------------|------|-----------|-------|
| <b>Matrix Spike Dup (BFK0042-MSD2)</b>   |        | <b>Source: 17J0529-05</b> |                 | Prepared: 02-Nov-2017 |             | Analyzed: 02-Nov-2017 17:51 |      |             |      |           |       |
| Vinyl Chloride                           | 10.6   | 0.06                      | 0.20            | ug/L                  | 10.0        | ND                          | 106  | 66-133      | 3.78 | 30        |       |
| Chloroform                               | 10.5   | 0.03                      | 0.20            | ug/L                  | 10.0        | ND                          | 105  | 80-122      | 3.14 | 30        |       |
| Trichloroethene                          | 9.78   | 0.05                      | 0.20            | ug/L                  | 10.0        | ND                          | 97.8 | 80-120      | 1.02 | 30        |       |
| Tetrachloroethene                        | 9.96   | 0.05                      | 0.20            | ug/L                  | 10.0        | ND                          | 99.6 | 80-120      | 4.50 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.06                      |                 | ug/L                  | 5.00        |                             | 101  | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.03                      |                 | ug/L                  | 5.00        | 5.84                        | 101  | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.04                      |                 | ug/L                  | 5.00        | 4.71                        | 101  | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.95                      |                 | ug/L                  | 5.00        | 4.47                        | 99.0 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.94                      |                 | ug/L                  | 5.00        | 5.31                        | 98.7 | 80-120      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Volatile Organic Compounds - Quality Control**

**Batch BFK0092 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                        | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0092-BLK1)</b>              |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 12:29 |      |             |      |           |       |
| Vinyl Chloride                           | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                               | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                          | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                        | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.12            |                 | ug/L  | 5.00        |   | 102  | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.62            |                 | ug/L  | 5.00        |   | 92.5 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.34            |                 | ug/L  | 5.00        |   | 86.9 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.32            |                 | ug/L  | 5.00        |   | 106  | 80-120      |      |           |       |
| <b>LCS (BFK0092-BS1)</b>                 |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 10:39 |      |             |      |           |       |
| Vinyl Chloride                           | 10.0   | 0.06            | 0.20            | ug/L  | 10.0        |   | 100  | 66-133      |      |           |       |
| Chloroform                               | 9.76   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.6 | 80-122      |      |           |       |
| Trichloroethene                          | 9.57   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.7 | 80-120      |      |           |       |
| Tetrachloroethene                        | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      |      |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.82            |                 | ug/L  | 5.00        |   | 96.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.62            |                 | ug/L  | 5.00        |   | 92.3 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.98            |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.83            |                 | ug/L  | 5.00        |   | 96.5 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.79            |                 | ug/L  | 5.00        |   | 95.8 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0092-BSD1)</b>            |        |                 |                 |       |             |   |      |             |      |           |       |
|  |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 12:09 |      |             |      |           |       |
| Vinyl Chloride                           | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      | 1.01 | 30        |       |
| Chloroform                               | 9.64   | 0.03            | 0.20            | ug/L  | 10.0        |   | 96.4 | 80-122      | 1.15 | 30        |       |
| Trichloroethene                          | 9.66   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.6 | 80-120      | 0.96 | 30        |       |
| Tetrachloroethene                        | 9.77   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.7 | 80-120      | 2.98 | 30        |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 4.82            |                 | ug/L  | 5.00        |   | 96.4 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 4.41            |                 | ug/L  | 5.00        |   | 88.2 | 80-129      |      |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 4.98            |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.88            |                 | ug/L  | 5.00        |   | 97.7 | 80-120      |      |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 5.02            |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |



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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0174 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte   | Result  | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|---------|---|-------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0174-BLK1)</b>   |         | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:21 |       |   |               |      |             |      |           |       |
| Mercury   | ND      | 0.000100  | mg/L  |   |               |      |             |      |           | U     |
| <b>LCS (BFK0174-BS1)</b>  |         | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 17:59 |       |   |               |      |             |      |           |       |
| Mercury   | 0.00231 | 0.000100  | mg/L  | 0.00200   |               | 116  | 80-120      |      |           |       |
| <b>Duplicate (BFK0174-DUP1)</b>   |         | <b>Source: 17J0529-01</b>                         |       | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:26 |               |      |             |      |           |       |
| Mercury   | ND      | 0.000100  | mg/L  |   | ND            |      |             |      |           | U     |
| <b>Duplicate (BFK0174-DUP2)</b>   |         | <b>Source: 17J0529-05</b>                         |       | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:34 |               |      |             |      |           |       |
| Mercury   | ND      | 0.000100  | mg/L  |   | ND            |      |             |      |           | U     |
| <b>Matrix Spike (BFK0174-MS1)</b>   |         | <b>Source: 17J0529-01</b>                         |       | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:27 |               |      |             |      |           |       |
| Mercury   | 0.00107 | 0.000100  | mg/L  | 0.00100   | ND            | 107  | 75-125      |      |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |   |       |   |               |      |             |      |           |       |
| <b>Matrix Spike (BFK0174-MS2)</b>   |         | <b>Source: 17J0529-05</b>                         |       | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:39 |               |      |             |      |           |       |
| Mercury   | 0.00103 | 0.000100  | mg/L  | 0.00100   | ND            | 103  | 75-125      |      |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |   |       |   |               |      |             |      |           |       |
| <b>Matrix Spike Dup (BFK0174-MSD1)</b>                                      |         | <b>Source: 17J0529-01</b>                         |       | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:29 |               |      |             |      |           |       |
| Mercury   | 0.00116 | 0.000100  | mg/L  | 0.00100   | ND            | 116  | 75-125      | 8.07 | 20        |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |   |       |   |               |      |             |      |           |       |
| <b>Matrix Spike Dup (BFK0174-MSD2)</b>                                      |         | <b>Source: 17J0529-05</b>                         |       | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 15:41 |               |      |             |      |           |       |
| Mercury   | 0.00110 | 0.000100  | mg/L  | 0.00100   | ND            | 110  | 75-125      | 6.57 | 20        |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |   |       |   |               |      |             |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0202 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC Limits | RPD    | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|-------------|--------|-----------|-------|
| <b>Blank (BFK0202-BLK1)</b>       |         |        |                 |                 |       | Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 00:48                    |               |             |        |           |       |
| Lead                              | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |             |        |           | U     |
| Arsenic                           | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |             |        |           | U     |
| <b>Blank (BFK0202-BLK2)</b>       |         |        |                 |                 |       | Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 01:40                    |               |             |        |           |       |
| Copper                            | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |             |        |           | U     |
| Copper                            | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |             |        |           | U     |
| Nickel                            | 60      | ND     | 0.0500          | 0.500           | ug/L  |  |               |             |        |           | U     |
| Nickel                            | 62      | 0.225  | 0.220           | 0.500           | ug/L  |  |               |             |        |           | J     |
| <b>LCS (BFK0202-BS1)</b>          |         |        |                 |                 |       | Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 00:29                    |               |             |        |           |       |
| Lead                              | 208     | 26.4   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 106         | 80-120 |           |       |
| Arsenic                           | 75a     | 28.3   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 113         | 80-120 |           |       |
| <b>LCS (BFK0202-BS2)</b>          |         |        |                 |                 |       | Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 02:29                    |               |             |        |           |       |
| Arsenic                           | 75a     | 28.2   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 113         | 80-120 |           |       |
| Copper                            | 63      | 28.4   | 0.340           | 0.500           | ug/L  | 25.0   |               | 114         | 80-120 |           |       |
| Copper                            | 65      | 27.9   | 0.350           | 0.500           | ug/L  | 25.0   |               | 112         | 80-120 |           |       |
| Nickel                            | 60      | 27.6   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 110         | 80-120 |           |       |
| Nickel                            | 62      | 28.8   | 0.220           | 0.500           | ug/L  | 25.0   |               | 115         | 80-120 |           |       |
| <b>Duplicate (BFK0202-DUP1)</b>   |         |        |                 |                 |       | Source: 17J0529-01 Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 00:58 |               |             |        |           |       |
| Lead                              | 208     | ND     | 0.0680          | 0.100           | ug/L  |  | ND            |             |        |           | U     |
| Arsenic                           | 75a     | 0.859  | 0.0220          | 0.200           | ug/L  |  | 0.752         |             | 13.30  | 20        |       |
| <b>Duplicate (BFK0202-DUP2)</b>   |         |        |                 |                 |       | Source: 17J0529-05 Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 01:18 |               |             |        |           |       |
| Arsenic                           | 75a     | 3.77   | 0.0220          | 0.200           | ug/L  |  | 3.29          |             | 13.60  | 20        |       |
| <b>Duplicate (BFK0202-DUP3)</b>   |         |        |                 |                 |       | Source: 17J0529-01 Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 01:45 |               |             |        |           |       |
| Copper                            | 63      | ND     | 0.340           | 0.500           | ug/L  |  | ND            |             |        |           | U     |
| Nickel                            | 60      | 0.671  | 0.0500          | 0.500           | ug/L  |  | 0.615         |             | 8.71   | 20        |       |
| <b>Duplicate (BFK0202-DUP4)</b>   |         |        |                 |                 |       | Source: 17J0529-05 Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 02:07 |               |             |        |           |       |
| Lead                              | 208     | 0.153  | 0.0680          | 0.100           | ug/L  |  | 0.124         |             | 20.90  | 20        | L     |
| Copper                            | 63      | 0.785  | 0.340           | 0.500           | ug/L  |  | 0.877         |             | 11.10  | 20        |       |
| Nickel                            | 60      | 0.943  | 0.0500          | 0.500           | ug/L  |  | 0.903         |             | 4.33   | 20        |       |
| <b>Matrix Spike (BFK0202-MS1)</b> |         |        |                 |                 |       | Source: 17J0529-01 Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 01:08 |               |             |        |           |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

### Metals and Metallic Compounds - Quality Control

#### Batch BFK0202 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|---------|--------|-----------------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|---------|--------|-----------------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**Matrix Spike (BFK0202-MS1)** Source: 17J0529-01 Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 01:08

|         |     |      |        |       |      |      |       |      |        |  |  |  |
|---------|-----|------|--------|-------|------|------|-------|------|--------|--|--|--|
| Lead    | 208 | 23.3 | 0.0680 | 0.100 | ug/L | 25.0 | ND    | 93.3 | 75-125 |  |  |  |
| Arsenic | 75a | 27.6 | 0.0220 | 0.200 | ug/L | 25.0 | 0.752 | 108  | 75-125 |  |  |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFK0202-MS2)** Source: 17J0529-05 Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 01:28

|         |     |      |        |       |      |      |      |     |        |  |  |  |
|---------|-----|------|--------|-------|------|------|------|-----|--------|--|--|--|
| Arsenic | 75a | 31.5 | 0.0220 | 0.200 | ug/L | 25.0 | 3.29 | 113 | 75-125 |  |  |  |
|---------|-----|------|--------|-------|------|------|------|-----|--------|--|--|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFK0202-MS3)** Source: 17J0529-01 Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 01:55

|         |     |      |        |       |      |      |       |      |        |  |  |  |
|---------|-----|------|--------|-------|------|------|-------|------|--------|--|--|--|
| Arsenic | 75a | 26.4 | 0.0220 | 0.200 | ug/L | 25.0 | 0.752 | 103  | 75-125 |  |  |  |
| Copper  | 63  | 26.1 | 0.340  | 0.500 | ug/L | 25.0 | ND    | 105  | 75-125 |  |  |  |
| Nickel  | 60  | 25.6 | 0.0500 | 0.500 | ug/L | 25.0 | 0.615 | 99.9 | 75-125 |  |  |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFK0202-MS4)** Source: 17J0529-05 Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 02:16

|         |     |      |        |       |      |      |       |      |        |  |  |  |
|---------|-----|------|--------|-------|------|------|-------|------|--------|--|--|--|
| Lead    | 208 | 23.2 | 0.0680 | 0.100 | ug/L | 25.0 | 0.124 | 92.2 | 75-125 |  |  |  |
| Arsenic | 75a | 29.0 | 0.0220 | 0.200 | ug/L | 25.0 | 3.29  | 103  | 75-125 |  |  |  |
| Copper  | 63  | 25.7 | 0.340  | 0.500 | ug/L | 25.0 | 0.877 | 99.3 | 75-125 |  |  |  |
| Nickel  | 60  | 25.6 | 0.0500 | 0.500 | ug/L | 25.0 | 0.903 | 98.7 | 75-125 |  |  |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike Dup (BFK0202-MSD1)** Source: 17J0529-01 Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 01:13

|         |     |      |        |       |      |      |       |      |        |      |    |  |
|---------|-----|------|--------|-------|------|------|-------|------|--------|------|----|--|
| Lead    | 208 | 22.8 | 0.0680 | 0.100 | ug/L | 25.0 | ND    | 91.3 | 75-125 | 2.10 | 20 |  |
| Arsenic | 75a | 26.2 | 0.0220 | 0.200 | ug/L | 25.0 | 0.752 | 102  | 75-125 | 5.28 | 20 |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike Dup (BFK0202-MSD2)** Source: 17J0529-05 Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 01:33

|         |     |      |        |       |      |      |      |     |        |      |    |  |
|---------|-----|------|--------|-------|------|------|------|-----|--------|------|----|--|
| Arsenic | 75a | 31.9 | 0.0220 | 0.200 | ug/L | 25.0 | 3.29 | 114 | 75-125 | 1.03 | 20 |  |
|---------|-----|------|--------|-------|------|------|------|-----|--------|------|----|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike Dup (BFK0202-MSD3)** Source: 17J0529-01 Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 02:00

|        |    |      |        |       |      |      |       |      |        |      |    |  |
|--------|----|------|--------|-------|------|------|-------|------|--------|------|----|--|
| Copper | 63 | 25.0 | 0.340  | 0.500 | ug/L | 25.0 | ND    | 99.8 | 75-125 | 4.57 | 20 |  |
| Nickel | 60 | 25.8 | 0.0500 | 0.500 | ug/L | 25.0 | 0.615 | 101  | 75-125 | 0.91 | 20 |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0202 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                      | Isotope | Result                    | Detection Limit | Reporting Limit | Units   | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|---------|---------------------------|-----------------|-----------------|---|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Matrix Spike Dup (BFK0202-MSD4)</b> |         | <b>Source: 17J0529-05</b> |                 |                 | Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 02:21 |             |               |      |             |      |           |       |
| Lead                                   | 208     | 23.7                      | 0.0680          | 0.100           | ug/L  | 25.0        | 0.124         | 94.3 | 75-125      | 2.24 | 20        |       |
| Copper                                 | 63      | 26.3                      | 0.340           | 0.500           | ug/L  | 25.0        | 0.877         | 102  | 75-125      | 2.36 | 20        |       |
| Nickel                                 | 60      | 27.0                      | 0.0500          | 0.500           | ug/L  | 25.0        | 0.903         | 105  | 75-125      | 5.56 | 20        |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0170 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFK0170-BLK1)</b>       |         |        |                 |                 |       | Prepared: 07-Nov-2017 Analyzed: 10-Nov-2017 23:30                    |               |      |             |       |           |       |
| Arsenic, Dissolved                | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |       |           | U     |
| Copper, Dissolved                 | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Copper, Dissolved                 | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel, Dissolved                 | 60      | ND     | 0.0500          | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel, Dissolved                 | 62      | ND     | 0.220           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| <b>Blank (BFK0170-BLK2)</b>       |         |        |                 |                 |       | Prepared: 07-Nov-2017 Analyzed: 13-Nov-2017 17:52                    |               |      |             |       |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |      |             |       |           | U     |
| <b>LCS (BFK0170-BS1)</b>          |         |        |                 |                 |       | Prepared: 07-Nov-2017 Analyzed: 11-Nov-2017 00:18                    |               |      |             |       |           |       |
| Arsenic, Dissolved                | 75a     | 25.9   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 104  | 80-120      |       |           |       |
| Copper, Dissolved                 | 63      | 28.8   | 0.340           | 0.500           | ug/L  | 25.0   |               | 115  | 80-120      |       |           |       |
| Copper, Dissolved                 | 65      | 28.4   | 0.350           | 0.500           | ug/L  | 25.0   |               | 114  | 80-120      |       |           |       |
| Nickel, Dissolved                 | 60      | 28.1   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 112  | 80-120      |       |           |       |
| Nickel, Dissolved                 | 62      | 28.3   | 0.220           | 0.500           | ug/L  | 25.0   |               | 113  | 80-120      |       |           |       |
| <b>LCS (BFK0170-BS2)</b>          |         |        |                 |                 |       | Prepared: 07-Nov-2017 Analyzed: 13-Nov-2017 18:41                    |               |      |             |       |           |       |
| Lead, Dissolved                   | 208     | 26.2   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 105  | 80-120      |       |           |       |
| <b>Duplicate (BFK0170-DUP1)</b>   |         |        |                 |                 |       | Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 10-Nov-2017 23:35 |               |      |             |       |           |       |
| Arsenic, Dissolved                | 75a     | 0.508  | 0.0220          | 0.200           | ug/L  |  | 0.552         |      |             | 8.30  | 20        |       |
| Copper, Dissolved                 | 63      | ND     | 0.340           | 0.500           | ug/L  |  | ND            |      |             |       |           | U     |
| Nickel, Dissolved                 | 60      | 0.581  | 0.0500          | 0.500           | ug/L  |  | 0.608         |      |             | 4.54  | 20        |       |
| <b>Duplicate (BFK0170-DUP2)</b>   |         |        |                 |                 |       | Source: 17J0529-06 Prepared: 07-Nov-2017 Analyzed: 11-Nov-2017 01:07 |               |      |             |       |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680          | 0.100           | ug/L  |  | ND            |      |             |       |           | U     |
| Arsenic, Dissolved                | 75a     | 1.04   | 0.0220          | 0.200           | ug/L  |  | 0.984         |      |             | 5.53  | 20        |       |
| Copper, Dissolved                 | 63      | ND     | 0.340           | 0.500           | ug/L  |  | ND            |      |             |       |           | U     |
| Nickel, Dissolved                 | 60      | 0.626  | 0.0500          | 0.500           | ug/L  |  | 0.549         |      |             | 13.10 | 20        |       |
| <b>Duplicate (BFK0170-DUP3)</b>   |         |        |                 |                 |       | Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 13-Nov-2017 17:57 |               |      |             |       |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680          | 0.100           | ug/L  |  | ND            |      |             |       |           | U     |
| <b>Matrix Spike (BFK0170-MS1)</b> |         |        |                 |                 |       | Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 10-Nov-2017 23:45 |               |      |             |       |           |       |
| Arsenic, Dissolved                | 75a     | 24.0   | 0.0220          | 0.200           | ug/L  | 25.0   | 0.552         | 93.6 | 75-125      |       |           |       |
| Copper, Dissolved                 | 63      | 24.3   | 0.340           | 0.500           | ug/L  | 25.0   | ND            | 97.2 | 75-125      |       |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0170 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|---------|--------|-----------------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|---------|--------|-----------------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**Matrix Spike (BFK0170-MS1) Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 10-Nov-2017 23:45**

|                   |    |      |        |       |      |      |       |      |        |  |  |  |
|-------------------|----|------|--------|-------|------|------|-------|------|--------|--|--|--|
| Nickel, Dissolved | 60 | 25.3 | 0.0500 | 0.500 | ug/L | 25.0 | 0.608 | 98.6 | 75-125 |  |  |  |
|-------------------|----|------|--------|-------|------|------|-------|------|--------|--|--|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFK0170-MS2) Source: 17J0529-06 Prepared: 07-Nov-2017 Analyzed: 11-Nov-2017 01:17**

|                    |     |      |        |       |      |      |       |      |        |  |  |  |
|--------------------|-----|------|--------|-------|------|------|-------|------|--------|--|--|--|
| Lead, Dissolved    | 208 | 24.0 | 0.0680 | 0.100 | ug/L | 25.0 | ND    | 95.8 | 75-125 |  |  |  |
| Arsenic, Dissolved | 75a | 24.3 | 0.0220 | 0.200 | ug/L | 25.0 | 0.984 | 93.4 | 75-125 |  |  |  |
| Copper, Dissolved  | 63  | 24.4 | 0.340  | 0.500 | ug/L | 25.0 | ND    | 97.4 | 75-125 |  |  |  |
| Nickel, Dissolved  | 60  | 25.2 | 0.0500 | 0.500 | ug/L | 25.0 | 0.549 | 98.7 | 75-125 |  |  |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFK0170-MS3) Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 13-Nov-2017 18:07**

|                 |     |      |        |       |      |      |    |     |        |  |  |  |
|-----------------|-----|------|--------|-------|------|------|----|-----|--------|--|--|--|
| Lead, Dissolved | 208 | 25.2 | 0.0680 | 0.100 | ug/L | 25.0 | ND | 101 | 75-125 |  |  |  |
|-----------------|-----|------|--------|-------|------|------|----|-----|--------|--|--|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike Dup (BFK0170-MSD1) Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 10-Nov-2017 23:50**

|                    |     |      |        |       |      |      |       |     |        |      |    |  |
|--------------------|-----|------|--------|-------|------|------|-------|-----|--------|------|----|--|
| Arsenic, Dissolved | 75a | 25.9 | 0.0220 | 0.200 | ug/L | 25.0 | 0.552 | 101 | 75-125 | 7.79 | 20 |  |
| Copper, Dissolved  | 63  | 26.2 | 0.340  | 0.500 | ug/L | 25.0 | ND    | 105 | 75-125 | 7.36 | 20 |  |
| Nickel, Dissolved  | 60  | 27.3 | 0.0500 | 0.500 | ug/L | 25.0 | 0.608 | 107 | 75-125 | 7.80 | 20 |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike Dup (BFK0170-MSD2) Source: 17J0529-06 Prepared: 07-Nov-2017 Analyzed: 11-Nov-2017 01:22**

|                    |     |      |        |       |      |      |       |      |        |      |    |  |
|--------------------|-----|------|--------|-------|------|------|-------|------|--------|------|----|--|
| Lead, Dissolved    | 208 | 22.4 | 0.0680 | 0.100 | ug/L | 25.0 | ND    | 89.7 | 75-125 | 6.58 | 20 |  |
| Arsenic, Dissolved | 75a | 25.3 | 0.0220 | 0.200 | ug/L | 25.0 | 0.984 | 97.4 | 75-125 | 4.04 | 20 |  |
| Copper, Dissolved  | 63  | 25.3 | 0.340  | 0.500 | ug/L | 25.0 | ND    | 101  | 75-125 | 3.91 | 20 |  |
| Nickel, Dissolved  | 60  | 26.5 | 0.0500 | 0.500 | ug/L | 25.0 | 0.549 | 104  | 75-125 | 4.89 | 20 |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike Dup (BFK0170-MSD3) Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 13-Nov-2017 18:12**

|                 |     |      |        |       |      |      |    |     |        |      |    |  |
|-----------------|-----|------|--------|-------|------|------|----|-----|--------|------|----|--|
| Lead, Dissolved | 208 | 26.9 | 0.0680 | 0.100 | ug/L | 25.0 | ND | 108 | 75-125 | 6.77 | 20 |  |
|-----------------|-----|------|--------|-------|------|------|----|-----|--------|------|----|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0175 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte   | Result  | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|---------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFK0175-BLK1)</b>   |         |                 |       |             | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 16:07                    |      |             |      |           |       |
| Mercury, Dissolved  | ND      | 0.000100        | mg/L  |             |  |      |             |      |           | U     |
| <b>LCS (BFK0175-BS1)</b>  |         |                 |       |             | Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 16:09                    |      |             |      |           |       |
| Mercury, Dissolved  | 0.00229 | 0.000100        | mg/L  | 0.00200     |  | 115  | 80-120      |      |           |       |
| <b>Duplicate (BFK0175-DUP1)</b>   |         |                 |       |             | Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 16:12 |      |             |      |           |       |
| Mercury, Dissolved  | ND      | 0.000100        | mg/L  |             | ND   |      |             |      |           | U     |
| <b>Duplicate (BFK0175-DUP2)</b>   |         |                 |       |             | Source: 17J0529-06 Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 16:20 |      |             |      |           |       |
| Mercury, Dissolved  | ND      | 0.000100        | mg/L  |             | ND   |      |             |      |           | U     |
| <b>Matrix Spike (BFK0175-MS1)</b>   |         |                 |       |             | Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 16:13 |      |             |      |           |       |
| Mercury, Dissolved  | 0.00106 | 0.000100        | mg/L  | 0.00100     | ND   | 106  | 75-125      |      |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |                 |       |             |  |      |             |      |           |       |
| <b>Matrix Spike (BFK0175-MS2)</b>   |         |                 |       |             | Source: 17J0529-06 Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 16:26 |      |             |      |           |       |
| Mercury, Dissolved  | 0.00100 | 0.000100        | mg/L  | 0.00100     | ND   | 100  | 75-125      |      |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |                 |       |             |  |      |             |      |           |       |
| <b>Matrix Spike Dup (BFK0175-MSD1)</b>                                      |         |                 |       |             | Source: 17J0529-02 Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 16:15 |      |             |      |           |       |
| Mercury, Dissolved  | 0.00105 | 0.000100        | mg/L  | 0.00100     | ND   | 105  | 75-125      | 0.95 | 20        |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |                 |       |             |  |      |             |      |           |       |
| <b>Matrix Spike Dup (BFK0175-MSD2)</b>                                      |         |                 |       |             | Source: 17J0529-06 Prepared: 07-Nov-2017 Analyzed: 08-Nov-2017 16:27 |      |             |      |           |       |
| Mercury, Dissolved  | 0.00110 | 0.000100        | mg/L  | 0.00100     | ND   | 110  | 75-125      | 9.52 | 20        |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |                 |       |             |  |      |             |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0238 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Alyte                 | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|--------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0238-BLK1)</b>     |        |                 |                    |       |             |   |      |             |      |           |       |
|                                 |        |                 |                    |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 14:05 |      |             |      |           |       |
| Aluminum, Dissolved             | ND     | 0.0085          | 0.0500             | mg/L  |             |   |      |             |      |           | U     |
| Calcium, Dissolved              | ND     | 0.0051          | 0.0500             | mg/L  |             |   |      |             |      |           | U     |
| Magnesium, Dissolved            | ND     | 0.0160          | 0.0500             | mg/L  |             |   |      |             |      |           | U     |
| Potassium, Dissolved            | ND     | 0.0520          | 0.500              | mg/L  |             |   |      |             |      |           | U     |
| Silicon, Dissolved              | ND     | 0.0052          | 0.0600             | mg/L  |             |   |      |             |      |           | U     |
| Sodium, Dissolved               | 0.0722 | 0.0114          | 0.500              | mg/L  |             |   |      |             |      |           | J     |
| Sodium, Dissolved               | ND     | 1.90            | 50.0               | mg/L  |             |   |      |             |      |           | U     |
| <b>Blank (BFK0238-BLK2)</b>     |        |                 |                    |       |             |   |      |             |      |           |       |
|                                 |        |                 |                    |       |             | Prepared: 09-Nov-2017 Analyzed: 13-Nov-2017 11:57 |      |             |      |           |       |
| Iron, Dissolved                 | 0.0088 | 0.0013          | 0.0500             | mg/L  |             |   |      |             |      |           | J     |
| Manganese, Dissolved            | ND     | 0.0003          | 0.0010             | mg/L  |             |   |      |             |      |           | U     |
| Sodium, Dissolved               | 0.0126 | 0.0114          | 0.500              | mg/L  |             |   |      |             |      |           | J     |
| Sodium, Dissolved               | ND     | 1.90            | 50.0               | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFK0238-BS1)</b>        |        |                 |                    |       |             |   |      |             |      |           |       |
|                                 |        |                 |                    |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 13:40 |      |             |      |           |       |
| Aluminum, Dissolved             | 2.05   | 0.0085          | 0.0500             | mg/L  | 2.00        |   | 103  | 80-120      |      |           |       |
| Calcium, Dissolved              | 9.82   | 0.0051          | 0.0500             | mg/L  | 10.0        |   | 98.2 | 80-120      |      |           |       |
| Iron, Dissolved                 | 1.96   | 0.0013          | 0.0500             | mg/L  | 2.00        |   | 98.0 | 80-120      |      |           |       |
| Magnesium, Dissolved            | 10.4   | 0.0160          | 0.0500             | mg/L  | 10.0        |   | 104  | 80-120      |      |           |       |
| Manganese, Dissolved            | 0.468  | 0.0003          | 0.0010             | mg/L  | 0.500       |   | 93.6 | 80-120      |      |           |       |
| Potassium, Dissolved            | 9.40   | 0.0520          | 0.500              | mg/L  | 10.0        |   | 94.0 | 80-120      |      |           |       |
| Silicon, Dissolved              | 9.72   | 0.0052          | 0.0600             | mg/L  | 10.0        |   | 97.2 | 80-120      |      |           |       |
| Sodium, Dissolved               | 9.88   | 0.0114          | 0.500              | mg/L  | 10.0        |   | 98.8 | 80-120      |      |           |       |
| Sodium, Dissolved               | 10.1   | 1.90            | 50.0               | mg/L  | 10.0        |   | 101  | 80-120      |      |           | J     |
| <b>Duplicate (BFK0238-DUP1)</b> |        |                 |                    |       |             |   |      |             |      |           |       |
|                                 |        |                 | Source: 17J0529-02 |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 12:57 |      |             |      |           |       |
| Aluminum, Dissolved             | 0.0100 | 0.0085          | 0.0500             | mg/L  |             | ND  |      |             |      |           | J     |
| Calcium, Dissolved              | 48.0   | 0.0051          | 0.0500             | mg/L  |             | 47.9  |      |             | 0.20 | 20        |       |
| Iron, Dissolved                 | 4.78   | 0.0013          | 0.0500             | mg/L  |             | 4.76  |      |             | 0.43 | 20        |       |
| Magnesium, Dissolved            | 61.1   | 0.0160          | 0.0500             | mg/L  |             | 60.7  |      |             | 0.60 | 20        |       |
| Manganese, Dissolved            | 1.66   | 0.0003          | 0.0010             | mg/L  |             | 1.64  |      |             | 0.87 | 20        |       |
| Potassium, Dissolved            | 15.1   | 0.0520          | 0.500              | mg/L  |             | 15.0  |      |             | 0.36 | 20        |       |
| Silicon, Dissolved              | 16.6   | 0.0052          | 0.0600             | mg/L  |             | 16.4  |      |             | 0.93 | 20        |       |
| Sodium, Dissolved               | 144    | 0.0114          | 0.500              | mg/L  |             | 143   |      |             | 0.75 | 20        | E     |
| Sodium, Dissolved               | 133    | 1.90            | 50.0               | mg/L  |             | 132   |      |             | 0.94 | 20        |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0238 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte               | Result | Detection Limit           | Reporting Limit | Units                 | Spike Level | Source Result               | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-----------------|-----------------------|-------------|-----------------------------|------|-------------|------|-----------|-------|
| <b>Duplicate (BFK0238-DUP2)</b> |        | <b>Source: 17J0529-06</b> |                 | Prepared: 09-Nov-2017 |             | Analyzed: 10-Nov-2017 13:18 |      |             |      |           |       |
| Aluminum, Dissolved             | ND     | 0.0085                    | 0.0500          | mg/L                  |             | ND                          |      |             |      |           | U     |
| Calcium, Dissolved              | 62.0   | 0.0051                    | 0.0500          | mg/L                  |             | 62.3                        |      |             | 0.41 | 20        |       |
| Iron, Dissolved                 | 9.82   | 0.0013                    | 0.0500          | mg/L                  |             | 9.60                        |      |             | 2.29 | 20        |       |
| Magnesium, Dissolved            | 46.7   | 0.0160                    | 0.0500          | mg/L                  |             | 45.2                        |      |             | 3.37 | 20        |       |
| Manganese, Dissolved            | 1.82   | 0.0003                    | 0.0010          | mg/L                  |             | 1.81                        |      |             | 0.42 | 20        |       |
| Potassium, Dissolved            | 33.3   | 0.0520                    | 0.500           | mg/L                  |             | 33.6                        |      |             | 0.89 | 20        |       |
| Silicon, Dissolved              | 25.0   | 0.0052                    | 0.0600          | mg/L                  |             | 24.4                        |      |             | 2.29 | 20        |       |
| Sodium, Dissolved               | 534    | 0.0114                    | 0.500           | mg/L                  |             | 531                         |      |             | 0.50 | 20        | E     |
| Sodium, Dissolved               | 495    | 1.90                      | 50.0            | mg/L                  |             | 478                         |      |             | 3.44 | 20        |       |

|                                   |      |                           |        |                       |       |                             |      |        |  |  |    |
|-----------------------------------|------|---------------------------|--------|-----------------------|-------|-----------------------------|------|--------|--|--|----|
| <b>Matrix Spike (BFK0238-MS1)</b> |      | <b>Source: 17J0529-02</b> |        | Prepared: 09-Nov-2017 |       | Analyzed: 10-Nov-2017 13:06 |      |        |  |  |    |
| Aluminum, Dissolved               | 2.03 | 0.0085                    | 0.0500 | mg/L                  | 2.00  | ND                          | 102  | 75-125 |  |  |    |
| Calcium, Dissolved                | 55.2 | 0.0051                    | 0.0500 | mg/L                  | 10.0  | 47.9                        | 73.1 | 75-125 |  |  | HC |
| Iron, Dissolved                   | 6.63 | 0.0013                    | 0.0500 | mg/L                  | 2.00  | 4.76                        | 93.8 | 75-125 |  |  |    |
| Magnesium, Dissolved              | 67.5 | 0.0160                    | 0.0500 | mg/L                  | 10.0  | 60.7                        | 67.0 | 75-125 |  |  | HC |
| Manganese, Dissolved              | 2.04 | 0.0003                    | 0.0010 | mg/L                  | 0.500 | 1.64                        | 78.3 | 75-125 |  |  |    |
| Potassium, Dissolved              | 25.0 | 0.0520                    | 0.500  | mg/L                  | 10.0  | 15.0                        | 99.5 | 75-125 |  |  |    |
| Silicon, Dissolved                | 25.7 | 0.0052                    | 0.0600 | mg/L                  | 10.0  | 16.4                        | 92.4 | 75-125 |  |  |    |
| Sodium, Dissolved                 | 151  | 0.0114                    | 0.500  | mg/L                  | 10.0  | 143                         | 78.3 | 75-125 |  |  | E  |
| Sodium, Dissolved                 | 141  | 1.90                      | 50.0   | mg/L                  | 10.0  | 132                         | 88.8 | 75-125 |  |  |    |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                           |        |                       |       |                             |      |        |  |  |    |
|-----------------------------------|------|---------------------------|--------|-----------------------|-------|-----------------------------|------|--------|--|--|----|
| <b>Matrix Spike (BFK0238-MS2)</b> |      | <b>Source: 17J0529-06</b> |        | Prepared: 09-Nov-2017 |       | Analyzed: 10-Nov-2017 13:27 |      |        |  |  |    |
| Aluminum, Dissolved               | 2.07 | 0.0085                    | 0.0500 | mg/L                  | 2.00  | ND                          | 103  | 75-125 |  |  |    |
| Calcium, Dissolved                | 70.8 | 0.0051                    | 0.0500 | mg/L                  | 10.0  | 62.3                        | 85.2 | 75-125 |  |  |    |
| Iron, Dissolved                   | 11.2 | 0.0013                    | 0.0500 | mg/L                  | 2.00  | 9.60                        | 81.5 | 75-125 |  |  |    |
| Magnesium, Dissolved              | 54.0 | 0.0160                    | 0.0500 | mg/L                  | 10.0  | 45.2                        | 88.4 | 75-125 |  |  |    |
| Manganese, Dissolved              | 2.21 | 0.0003                    | 0.0010 | mg/L                  | 0.500 | 1.81                        | 81.4 | 75-125 |  |  |    |
| Potassium, Dissolved              | 45.6 | 0.0520                    | 0.500  | mg/L                  | 10.0  | 33.6                        | 120  | 75-125 |  |  |    |
| Silicon, Dissolved                | 34.2 | 0.0052                    | 0.0600 | mg/L                  | 10.0  | 24.4                        | 98.4 | 75-125 |  |  |    |
| Sodium, Dissolved                 | 546  | 0.0114                    | 0.500  | mg/L                  | 10.0  | 531                         | 142  | 75-125 |  |  | E  |
| Sodium, Dissolved                 | 481  | 1.90                      | 50.0   | mg/L                  | 10.0  | 478                         | 26.5 | 75-125 |  |  | HC |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|  |      |                           |        |                       |      |                             |     |        |      |    |  |
|--|------|---------------------------|--------|-----------------------|------|-----------------------------|-----|--------|------|----|--|
| <b>Matrix Spike Dup (BFK0238-MSD1)</b> |      | <b>Source: 17J0529-02</b> |        | Prepared: 09-Nov-2017 |      | Analyzed: 10-Nov-2017 13:11 |     |        |      |    |  |
| Aluminum, Dissolved                    | 2.05 | 0.0085                    | 0.0500 | mg/L                  | 2.00 | ND                          | 103 | 75-125 | 0.99 | 20 |  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0238 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                      | Result | Detection Limit           | Reporting Limit | Units                 | Spike Level | Source Result               | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|---------------------------|-----------------|-----------------------|-------------|-----------------------------|------|-------------|------|-----------|-------|
| <b>Matrix Spike Dup (BFK0238-MSD1)</b> |        | <b>Source: 17J0529-02</b> |                 | Prepared: 09-Nov-2017 |             | Analyzed: 10-Nov-2017 13:11 |      |             |      |           |       |
| Calcium, Dissolved                     | 55.4   | 0.0051                    | 0.0500          | mg/L                  | 10.0        | 47.9                        | 74.9 | 75-125      | 0.33 | 20        | HC    |
| Iron, Dissolved                        | 6.60   | 0.0013                    | 0.0500          | mg/L                  | 2.00        | 4.76                        | 92.3 | 75-125      | 0.47 | 20        |       |
| Magnesium, Dissolved                   | 67.7   | 0.0160                    | 0.0500          | mg/L                  | 10.0        | 60.7                        | 69.6 | 75-125      | 0.38 | 20        | HC    |
| Manganese, Dissolved                   | 2.04   | 0.0003                    | 0.0010          | mg/L                  | 0.500       | 1.64                        | 79.5 | 75-125      | 0.30 | 20        |       |
| Potassium, Dissolved                   | 25.3   | 0.0520                    | 0.500           | mg/L                  | 10.0        | 15.0                        | 102  | 75-125      | 1.14 | 20        |       |
| Silicon, Dissolved                     | 25.7   | 0.0052                    | 0.0600          | mg/L                  | 10.0        | 16.4                        | 92.5 | 75-125      | 0.02 | 20        |       |
| Sodium, Dissolved                      | 151    | 0.0114                    | 0.500           | mg/L                  | 10.0        | 143                         | 78.7 | 75-125      | 0.03 | 20        | E     |
| Sodium, Dissolved                      | 140    | 1.90                      | 50.0            | mg/L                  | 10.0        | 132                         | 78.0 | 75-125      | 0.77 | 20        |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|  |      |                           |        |                       |       |                             |      |        |      |    |    |
|--|------|---------------------------|--------|-----------------------|-------|-----------------------------|------|--------|------|----|----|
| <b>Matrix Spike Dup (BFK0238-MSD2)</b> |      | <b>Source: 17J0529-06</b> |        | Prepared: 09-Nov-2017 |       | Analyzed: 10-Nov-2017 13:33 |      |        |      |    |    |
| Aluminum, Dissolved                    | 2.06 | 0.0085                    | 0.0500 | mg/L                  | 2.00  | ND                          | 103  | 75-125 | 0.03 | 20 |    |
| Calcium, Dissolved                     | 71.1 | 0.0051                    | 0.0500 | mg/L                  | 10.0  | 62.3                        | 88.2 | 75-125 | 0.43 | 20 |    |
| Iron, Dissolved                        | 11.2 | 0.0013                    | 0.0500 | mg/L                  | 2.00  | 9.60                        | 81.3 | 75-125 | 0.05 | 20 |    |
| Magnesium, Dissolved                   | 54.2 | 0.0160                    | 0.0500 | mg/L                  | 10.0  | 45.2                        | 90.0 | 75-125 | 0.30 | 20 |    |
| Manganese, Dissolved                   | 2.21 | 0.0003                    | 0.0010 | mg/L                  | 0.500 | 1.81                        | 81.3 | 75-125 | 0.02 | 20 |    |
| Potassium, Dissolved                   | 45.3 | 0.0520                    | 0.500  | mg/L                  | 10.0  | 33.6                        | 117  | 75-125 | 0.81 | 20 |    |
| Silicon, Dissolved                     | 33.9 | 0.0052                    | 0.0600 | mg/L                  | 10.0  | 24.4                        | 94.5 | 75-125 | 1.15 | 20 |    |
| Sodium, Dissolved                      | 541  | 0.0114                    | 0.500  | mg/L                  | 10.0  | 531                         | 93.2 | 75-125 | 0.89 | 20 | E  |
| Sodium, Dissolved                      | 483  | 1.90                      | 50.0   | mg/L                  | 10.0  | 478                         | 51.2 | 75-125 | 0.51 | 20 | HC |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

Wet Chemistry - Quality Control

Batch BFJ0822 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0822-BLK1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 28-Oct-2017 Analyzed: 28-Oct-2017 11:22                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Chloride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Fluoride  | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus   | ND     | 0.10            | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate   | ND     | 0.100           | mg/L   |             |               |      |             |      |           | U     |
| <b>LCS (BFJ0822-BS1)</b>  |        |                 |        |             |               |      |             |      |           |       |
| Prepared: 28-Oct-2017 Analyzed: 28-Oct-2017 11:42                       |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 1.50   | 0.100           | mg/L   | 1.50        |               | 100  | 90-110      |      |           |       |
| Chloride  | 1.52   | 0.100           | mg/L   | 1.50        |               | 101  | 90-110      |      |           |       |
| Fluoride  | 1.53   | 0.100           | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| Nitrate-N   | 1.56   | 0.100           | mg-N/L | 1.50        |               | 104  | 90-110      |      |           |       |
| Nitrite-N   | 1.54   | 0.100           | mg-N/L | 1.50        |               | 103  | 90-110      |      |           |       |
| Orthophosphorus   | 1.45   | 0.10            | mg-P/L | 1.50        |               | 96.3 | 90-110      |      |           |       |
| Sulfate   | 1.60   | 0.100           | mg/L   | 1.50        |               | 107  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0822-DUP1)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0529-02 Prepared: 28-Oct-2017 Analyzed: 28-Oct-2017 12:21    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 0.165  | 0.100           | mg/L   |             | 0.166         |      |             | 0.60 | 20        |       |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Orthophosphorus   | 0.37   | 0.10            | mg-P/L |             | 0.38          |      |             | 4.81 | 20        |       |
| <b>Duplicate (BFJ0822-DUP2)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0529-06 Prepared: 28-Oct-2017 Analyzed: 28-Oct-2017 13:41    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 0.605  | 0.100           | mg/L   |             | 0.616         |      |             | 1.80 | 20        |       |
| Fluoride  | 1.05   | 0.100           | mg/L   |             | 1.05          |      |             | 0.38 | 20        |       |
| Nitrate-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Nitrite-N   | ND     | 0.100           | mg-N/L |             | ND            |      |             |      |           | U     |
| Orthophosphorus   | 1.89   | 0.10            | mg-P/L |             | 1.85          |      |             | 2.03 | 20        |       |
| Sulfate   | 0.632  | 0.100           | mg/L   |             | 0.615         |      |             | 2.73 | 20        |       |
| <b>Duplicate (BFJ0822-DUP3)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0529-02RE1 Prepared: 28-Oct-2017 Analyzed: 29-Oct-2017 03:25 |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 2.46   | 0.200           | mg/L   |             | 2.45          |      |             | 0.41 | 20        | D     |
| Sulfate   | 2.58   | 0.200           | mg/L   |             | 2.62          |      |             | 1.39 | 20        | D     |
| <b>Duplicate (BFJ0822-DUP4)</b>   |        |                 |        |             |               |      |             |      |           |       |
| Source: 17J0529-02RE2 Prepared: 28-Oct-2017 Analyzed: 05-Nov-2017 02:20 |        |                 |        |             |               |      |             |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

Wet Chemistry - Quality Control

Batch BFJ0822 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Duplicate (BFJ0822-DUP4)</b> Source: 17J0529-02RE2 Prepared: 28-Oct-2017 Analyzed: 05-Nov-2017 02:20   |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 148    | 20.0            | mg/L   |             | 153           |      | 75-125      | 2.90 | 20        | D     |
| <b>Duplicate (BFJ0822-DUP5)</b> Source: 17J0529-06RE1 Prepared: 28-Oct-2017 Analyzed: 05-Nov-2017 04:23   |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 447    | 50.0            | mg/L   |             | 447           |      | 75-125      | 0.12 | 20        | D     |
| <b>Matrix Spike (BFJ0822-MS1)</b> Source: 17J0529-02 Prepared: 28-Oct-2017 Analyzed: 28-Oct-2017 12:41    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 2.06   | 0.100           | mg/L   | 2.00        | 0.166         | 94.5 | 75-125      |      |           |       |
| Nitrate-N   | 2.16   | 0.100           | mg-N/L | 2.00        | ND            | 108  | 75-125      |      |           |       |
| Nitrite-N   | 1.98   | 0.100           | mg-N/L | 2.00        | ND            | 99.1 | 75-125      |      |           |       |
| Orthophosphorus   | 2.33   | 0.10            | mg-P/L | 2.00        | 0.38          | 97.4 | 75-125      |      |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0822-MS2)</b> Source: 17J0529-06 Prepared: 28-Oct-2017 Analyzed: 28-Oct-2017 14:01    |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 2.65   | 0.100           | mg/L   | 2.00        | 0.616         | 102  | 75-125      |      |           | E     |
| Nitrate-N   | 2.20   | 0.100           | mg-N/L | 2.00        | ND            | 110  | 75-125      |      |           |       |
| Nitrite-N   | 1.98   | 0.100           | mg-N/L | 2.00        | ND            | 98.9 | 75-125      |      |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0822-MS3)</b> Source: 17J0529-02RE1 Prepared: 28-Oct-2017 Analyzed: 29-Oct-2017 03:44 |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 6.59   | 0.500           | mg/L   | 4.00        | 2.45          | 103  | 75-125      |      |           | D     |
| Sulfate   | 6.70   | 0.500           | mg/L   | 4.00        | 2.62          | 102  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0822-MS4)</b> Source: 17J0529-06 Prepared: 28-Oct-2017 Analyzed: 29-Oct-2017 04:24    |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 3.16   | 0.200           | mg/L   | 2.00        | 1.05          | 105  | 75-125      |      |           | D     |
| Orthophosphorus   | 3.71   | 0.20            | mg-P/L | 2.00        | 1.85          | 93.0 | 75-125      |      |           | D     |
| Sulfate   | 2.69   | 0.200           | mg/L   | 2.00        | 0.615         | 104  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0822-MS5)</b> Source: 17J0529-02RE2 Prepared: 28-Oct-2017 Analyzed: 05-Nov-2017 02:40 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 344    | 50.0            | mg/L   | 200         | 153           | 95.7 | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0822-MS6)</b> Source: 17J0529-06RE1 Prepared: 28-Oct-2017 Analyzed: 05-Nov-2017 04:43 |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 1450   | 100             | mg/L   | 1000        | 447           | 100  | 75-125      |      |           | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Nov-2017 14:27

**Wet Chemistry - Quality Control**

**Batch BFJ0822 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Reported:  
20-Nov-2017 14:27

### Wet Chemistry - Quality Control

#### Batch BFJ0858 - No Prep Wet Chem

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0858-BLK1)</b>     |        |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 14:34                    |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0             | mg/L  |             |  |      |             |      |           | U     |
| <b>LCS (BFJ0858-BS1)</b>        |        |                 |       |             | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 14:34                    |      |             |      |           |       |
| Dissolved Solids                | 493    | 5.0             | mg/L  | 500         |  | 98.6 | 90-110      |      |           |       |
| <b>Duplicate (BFJ0858-DUP2)</b> |        |                 |       |             | Source: 17J0529-02 Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 14:34 |      |             |      |           |       |
| Dissolved Solids                | 683    | 10.0            | mg/L  |             | 671  |      |             | 1.77 | 20        |       |
| <b>Duplicate (BFJ0858-DUP3)</b> |        |                 |       |             | Source: 17J0529-06 Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 14:34 |      |             |      |           |       |
| Dissolved Solids                | 1600   | 20.0            | mg/L  |             | 1540   |      |             | 3.95 | 20        |       |



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Project Manager: Troy Bussey Jr.

Reported:  
20-Nov-2017 14:27

Wet Chemistry - Quality Control

Batch BFJ0860 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level                                       | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|------------|---|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFJ0860-BLK1)</b>     |        | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 14:03 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| <b>Duplicate (BFJ0860-DUP1)</b> |        | <b>Source: 17J0529-02</b>                         |            | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 14:03 |               |      |              |      |           |       |
| Alkalinity, Total               | 434    | 1.00  | mg/L CaCO3 |   | 434           |      |              | 0.00 |           |       |
| <b>Duplicate (BFJ0860-DUP2)</b> |        | <b>Source: 17J0529-06</b>                         |            | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 14:03 |               |      |              |      |           |       |
| Alkalinity, Total               | 771    | 1.00  | mg/L CaCO3 |   | 770           |      |              | 0.13 | 20        |       |
| <b>Reference (BFJ0860-SRM1)</b> |        | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 14:03 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | 105    | 1.00  | mg/L CaCO3 | 108   |               | 97.7 | 90.37-108.33 |      |           |       |



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Reported:  
20-Nov-2017 14:27

Wet Chemistry - Quality Control

Batch BFK0300 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte   | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|---|-------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0300-BLK1)</b>   |        | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 20:31 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | ND     | 0.50  | mg/L  |   |               |      |             |      |           | U     |
| <b>LCS (BFK0300-BS1)</b>  |        | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 20:50 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 20.9   | 0.50  | mg/L  | 20.0  |               | 104  | 90-110      |      |           |       |
| <b>Duplicate (BFK0300-DUP2)</b>   |        | <b>Source: 17J0529-02</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 12-Nov-2017 02:39 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 9.27   | 1.00  | mg/L  |   | 9.17          |      |             | 1.08 | 20        | D     |
| <b>Duplicate (BFK0300-DUP3)</b>   |        | <b>Source: 17J0529-06</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 10:00 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 18.7   | 1.00  | mg/L  |   | 19.0          |      |             | 1.33 | 20        | D     |
| <b>Matrix Spike (BFK0300-MS3)</b>   |        | <b>Source: 17J0529-06</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 11-Nov-2017 10:22 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 41.5   | 1.00  | mg/L  | 20.0  | 19.0          | 113  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |       |   |               |      |             |      |           |       |
| <b>Matrix Spike (BFK0300-MS5)</b>   |        | <b>Source: 17J0529-02</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 16-Nov-2017 18:26 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 29.2   | 1.00  | mg/L  | 20.0  | 9.17          | 100  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |       |   |               |      |             |      |           |       |



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Reported:  
20-Nov-2017 14:27

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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Reported:  
20-Nov-2017 14:27

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |





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Reported:  
20-Nov-2017 14:27

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
20-Nov-2017 14:27

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Reported:  
20-Nov-2017 14:27

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



21 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0562

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



**Chain of Custody Record & Laboratory Analysis Request**

ARI Assigned Number: **1710562** Turn-around Requested: **Normal**

ARI Client Company: **Pioneer Technologies** Phone: **360-570-1700**

Client Contact: **Troy Bussey (busseyt@uspioneer.com)**

Client Project Name: **Arkema FS DG Inv**

Client Project #: **79227** Samplers: **DG Cooper 206-660-3466**

Date: **10.30.17** of **2**

Page: **1**

No. of Coolers: \_\_\_\_\_

No. of Cooler Temps: \_\_\_\_\_

| Sample ID               | Date     | Time | Matrix | No. Containers | Analysis Requested                             |  |  |                                   |                         |  | Notes/Comments |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|----------|------|--------|----------------|--|--|--|-----------------------------------|-------------------------|--|----------------|--|--|--|--|--|--|--|--|--|--|--|--|
|                         |          |      |        |                | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-131+00-2-102717      | 10-27-17 | 1300 | Water  | 3              | X  |  |  |                                   |                         |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-131+00-2-102717-(20) |          |      |        | 3              | X  | X  | X  | X                                 |                         |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-129+65-0-103017      | 10-30-17 | 940  |        |                | X  |  |  |                                   | X                       |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-129+65-0-103017-(20) |          | 940  |        |                | X  |  |  |                                   | X                       |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-128+30-0-103017      |          | 1100 |        |                | X  |  |  |                                   |                         |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-128+30-0-103017-(20) |          | 1100 |        |                | X  |  |  |                                   | X                       |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-128+30-2-103017      |          | 1145 |        |                | X  |  |  |                                   |                         |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-128+30-2-103017-(20) |          | 1145 |        |                | X  |  |  |                                   |                         |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-129+65-2-103017      |          | 1150 |        |                | X  |  |  |                                   |                         |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-129+65-2-103017-(20) |          | 1150 |        |                | X  |  |  |                                   |                         |  |                |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-126+90-2-103017      |          | 1300 |        | 4              | X  |  |  |                                   |                         |  |                |  |  |  |  |  |  |  |  |  |  |  |  |

Relinquished by: (Signature) \_\_\_\_\_

Printed Name: **Luke Perona**

Company: **ARI**

Date & Time: **10-30-17 1725**

Relinquished by: (Signature) \_\_\_\_\_

Printed Name: **Stephanie Fiswi**

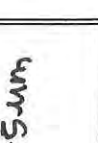
Company: **ARI**

Date & Time: **10/30/17 1725**

Comments/Special Instructions: **Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma #79227**

**Limit of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 1710562 Turn-around Requested: Normal

ARI Client Company: Pioneer Technologies Phone: 360-570-1700

Client Contact: Troy Bussey (busseyt@uspioneer.com)

Client Project Name: Arkema FS DG Inv

Client Project #: 79227 Samplers: DG Cooper 206-660-3466

Date: 10.30.17 of 2

Page: 2

No. of Coolers: 2 Cooler Temps: \_\_\_\_\_

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



| Sample ID               | Date     | Time | Matrix | No. Containers | Analysis Requested                             |   |  |                                   |                         |   | Notes/Comments |   |
|-------------------------|----------|------|--------|----------------|--|---|--|-----------------------------------|-------------------------|---|----------------|---|
|                         |          |      |        |                | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Nitrate, Chloride, Fluoride, Nitrate, EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B | Total As, Cu, Pb, Ni, Hg EPA 6020A/470A |                |   |
| GW-126+90-2-103017-(20) | 10-30-17 | 1300 | water  | 3              |  | X   | X  | X                                 | X                       | X                                       |                | Dissolved samples field filtered 0.45um<br>MS/MSD<br>MS/MSD |
| GW-125+00-2-103017      |          | 1330 |        | 1              | X  |   |  |                                   |                         |   |                |   |
| GW-125+00-2-103017-(20) |          | 1330 |        | 1              |  | X   | X  | X                                 | X                       |   |                |   |
| GW-124+00-2-103017      |          | 1430 |        | 1              | X  |   |  |                                   |                         |   |                |   |
| GW-124+00-2-103017-(20) |          | 1430 |        | 1              |  | X   | X  | X                                 | X                       |   |                |   |
| GW-6E3-2-103017#        |          | 1515 |        | 4              | X  |   |  |                                   |                         | X                                       |                |   |
| GW-6E3-2-103017-(20)    |          | 1515 |        | 4              |  | X   | X  | X                                 | X                       |   |                |   |
| GW-121+80-2-103017      |          | 1540 |        | 3              | X  |   |  |                                   |                         |   |                |   |
| GW-121+80-2-103017-(20) |          | 1540 |        | 3              |  | X   | X  | X                                 | X                       |   |                |   |
|                         |          |      |        |                |  |   |  |                                   |                         |   |                |   |

Comments/Special Instructions: Submit EDD to PIONEER using PIONEER EDD format 3ill to Port of Tacoma 20#79227

Relinquished by: (Signature) [Signature] Received by: (Signature) [Signature]

Printed Name: Luke Henry Printed Name: Stephanie Finner

Company: DOF Company: ARI

Date & Time: 10/30/17 17.25 Date & Time: 10/30/17 0725

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSEDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





WORK ORDER

17J0562

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID           | Container Type                              | pH             |
|------------------------|---|----------------|
| 17J0562-01 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-01 B <i>hs</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-01 C <i>hs</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-02 A           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>L2 pass</i> |
| 17J0562-02 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17J0562-02 C           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17J0562-03 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-03 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-03 C           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-04 A           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>L2 pass</i> |
| 17J0562-04 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17J0562-04 C           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17J0562-05 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-05 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-05 C           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-06 A           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>L2 pass</i> |
| 17J0562-06 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17J0562-06 C           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17J0562-07 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-07 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-07 C <i>sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-08 A           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>L2 pass</i> |
| 17J0562-08 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17J0562-08 C           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17J0562-09 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-09 B <i>sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-09 C <i>lg</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17J0562-10 A           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>L2 pass</i> |
| 17J0562-10 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17J0562-10 C           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17J0562-11 A           | VOA Vial, Clear, 40 mL, HCL                 |                |



WORK ORDER

17J0562

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |

|              |                                   |    |         |
|--------------|-----------------------------------|----|---------|
| 17J0562-11 B | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-11 C | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-12 A | Glass NM, Amber, 250 mL, 9N H2SO4 | FF |         |
| 17J0562-12 B | Small OJ, 500 mL                  | FF |         |
| 17J0562-12 C | Large OJ, 1000 mL                 | FF |         |
| 17J0562-13 A | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-13 B | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-13 C | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-14 A | Glass NM, Amber, 250 mL, 9N H2SO4 | FF |         |
| 17J0562-14 B | Small OJ, 500 mL                  | FF |         |
| 17J0562-14 C | Large OJ, 1000 mL                 | FF |         |
| 17J0562-15 A | pb VOA Vial, Clear, 40 mL, HCL    |    |         |
| 17J0562-15 B | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-15 C | pb VOA Vial, Clear, 40 mL, HCL    |    |         |
| 17J0562-15 D | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-15 E | pb VOA Vial, Clear, 40 mL, HCL    |    |         |
| 17J0562-15 F | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-16 A | Glass NM, Amber, 250 mL, 9N H2SO4 | FF | >2 pass |
| 17J0562-16 B | Small OJ, 500 mL                  | FF |         |
| 17J0562-16 C | Large OJ, 1000 mL                 | FF |         |
| 17J0562-17 A | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-17 B | hs VOA Vial, Clear, 40 mL, HCL    |    |         |
| 17J0562-17 C | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-17 D | HDPE NM, 500 mL, 1:1 HNO3         |    | >2 pass |
| 17J0562-18 A | Glass NM, Amber, 250 mL, 9N H2SO4 | FF | >2 pass |
| 17J0562-18 B | Small OJ, 500 mL                  | FF |         |
| 17J0562-18 C | Large OJ, 1000 mL                 | F  |         |
| 17J0562-18 D | HDPE NM, 1000 mL, 1:1 HNO3 (FF)   |    | >2 pass |
| 17J0562-19 A | lg VOA Vial, Clear, 40 mL, HCL    |    |         |
| 17J0562-19 B | VOA Vial, Clear, 40 mL, HCL       |    |         |
| 17J0562-19 C | hs VOA Vial, Clear, 40 mL, HCL    |    |         |
| 17J0562-20 A | Glass NM, Amber, 250 mL, 9N H2SO4 | FF | >2 fail |
| 17J0562-20 B | Small OJ, 500 mL                  | FF |         |
| 17J0562-20 C | Large OJ, 1000 mL                 | FF |         |





**WORK ORDER**

17J0562

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |
| 17J0562-21 A  | VOA Vial, Clear, 40 mL, HCL                                       |

Preservation Confirmed By \_\_\_\_\_

Date \_\_\_\_\_



# Cooler Receipt Form

ARI Client: Pioneer

Project Name: Arkema FS DG Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17J0562

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of cooler? YES NO

Were custody papers included with the cooler? ..... YES NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 7.6

Time: 1725

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: SF Date: 10/30/17 Time: 1725

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES NO

Were all bottles sealed in individual plastic bags? ..... YES NO

Did all bottles arrive in good condition (unbroken)? ..... YES NO

Were all bottle labels complete and legible? ..... YES NO

Did the number of containers listed on COC match with the number of containers received? ..... SF YES NO

Did all bottle labels and tags agree with custody papers? ..... YES NO

Were all bottles used correct for the requested analyses? ..... YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? ..... NA YES NO

Was sufficient amount of sample sent in each bottle? ..... YES NO

Date VOC Trip Blank was made at ARI..... NA 10/23/17

Was Sample Split by ARI : NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

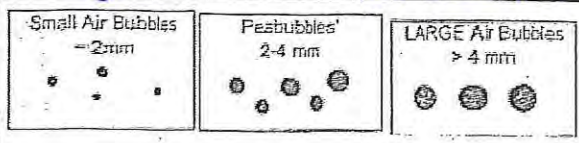
Samples Logged by: SF Date: 10/30/17 Time: 1756

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:** Sample 15 on COC says 3 containers, received 6. No trip blank on COC

By: SF Date: 10/30/17



Small → "sm" (< 2 mm)  
Peabubbles → "pb" (2 to < 4 mm)  
Large → "lg" (4 to < 6 mm)  
Headspace → "hs" (> 6 mm)



# Cooler Temperature Compliance Form

| Cooler#:                 | Temperature(°C): 7.6 |             |
|--------------------------|----------------------|-------------|
| Sample ID                | Bottle Count         | Bottle Type |
| Samples received above 6 |                      |             |
|                          |                      |             |
|                          |                      |             |
|                          |                      |             |
|                          |                      |             |
|                          |                      |             |
|                          |                      |             |
|                          |                      |             |
|                          |                      |             |
|                          |                      |             |

| Cooler#:  | Temperature(°C): |             |
|-----------|------------------|-------------|
| Sample ID | Bottle Count     | Bottle Type |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |

| Cooler#:  | Temperature(°C): |             |
|-----------|------------------|-------------|
| Sample ID | Bottle Count     | Bottle Type |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |

| Cooler#:  | Temperature(°C): |             |
|-----------|------------------|-------------|
| Sample ID | Bottle Count     | Bottle Type |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |

Completed by: SF Date: 10/30/17 Time: 1725





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID               | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-------------------------|---------------|--------|-------------------|-------------------|
| GW-131+00-2-102717      | 17J0562-01    | Water  | 27-Oct-2017 13:00 | 30-Oct-2017 17:25 |
| GW-131+00-2-102717-(20) | 17J0562-02    | Water  | 27-Oct-2017 13:00 | 30-Oct-2017 17:25 |
| GW-129+65-0-103017      | 17J0562-03    | Water  | 30-Oct-2017 09:40 | 30-Oct-2017 17:25 |
| GW-129+65-0-103017-(20) | 17J0562-04    | Water  | 30-Oct-2017 09:40 | 30-Oct-2017 17:25 |
| GW-128+30-0-103017      | 17J0562-05    | Water  | 30-Oct-2017 11:00 | 30-Oct-2017 17:25 |
| GW-128+30-0-103017-(20) | 17J0562-06    | Water  | 30-Oct-2017 11:00 | 30-Oct-2017 17:25 |
| GW-128+30-2-103017      | 17J0562-07    | Water  | 30-Oct-2017 11:45 | 30-Oct-2017 17:25 |
| GW-128+30-2-103017-(20) | 17J0562-08    | Water  | 30-Oct-2017 11:45 | 30-Oct-2017 17:25 |
| GW-129+65-2-103017      | 17J0562-09    | Water  | 30-Oct-2017 11:50 | 30-Oct-2017 17:25 |
| GW-129+65-2-103017-(20) | 17J0562-10    | Water  | 30-Oct-2017 11:50 | 30-Oct-2017 17:25 |
| GW-126+90-2-103017      | 17J0562-11    | Water  | 30-Oct-2017 13:00 | 30-Oct-2017 17:25 |
| GW-126+90-2-103017-(20) | 17J0562-12    | Water  | 30-Oct-2017 13:00 | 30-Oct-2017 17:25 |
| GW-125+50-2-103017      | 17J0562-13    | Water  | 30-Oct-2017 13:30 | 30-Oct-2017 17:25 |
| GW-125+50-2-103017-(20) | 17J0562-14    | Water  | 30-Oct-2017 13:30 | 30-Oct-2017 17:25 |
| GW-124+00-2-103017      | 17J0562-15    | Water  | 30-Oct-2017 14:30 | 30-Oct-2017 17:25 |
| GW-124+00-2-103017-(20) | 17J0562-16    | Water  | 30-Oct-2017 14:30 | 30-Oct-2017 17:25 |
| GW-6E3-2-103017         | 17J0562-17    | Water  | 30-Oct-2017 15:15 | 30-Oct-2017 17:25 |
| GW-6E3-2-103017-(20)    | 17J0562-18    | Water  | 30-Oct-2017 15:15 | 30-Oct-2017 17:25 |
| GW-121+80-2-103017      | 17J0562-19    | Water  | 30-Oct-2017 15:40 | 30-Oct-2017 17:25 |
| GW-121+80-2-103017-(20) | 17J0562-20    | Water  | 30-Oct-2017 15:40 | 30-Oct-2017 17:25 |
| Trip Blank              | 17J0562-21    | Water  | 27-Oct-2017 00:00 | 30-Oct-2017 17:25 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 30, 2017 under ARI workorder 17J0562. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

A matrix spike and matrix spike duplicate were prepared in conjunction with sample GW -125+00-2-103017. The matrix spike/matrix spike duplicate percent recoveries and RPD were within QC limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW -6E3-2-103017-(20). The duplicate RPD were within QC limits. The matrix spike has a natural concentration of Arsenic that is so much greater than the concentration



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

spiked that an accurate determination of spike recovery is not possible. The Arsenic has been flagged with an "HC" qualifier on the matrix spike. No further corrective action was taken.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFK0238 has Iron and Sodium detected below the reporting limits, but above the method detection limits. The Iron and Sodium have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

#### **Anions - EPA Method 300.0**

Sample GW-131+00-2-102717-(20) was received outside of the 48 hour holding time for Nitrate, Nitrite and O-Phos, and has been flagged with "H" qualifiers.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-124+00-2-103017-(20). The duplicate RPD were within QC limits. The matrix spike has low spike recovery for Nitrite. This is likely due to the Sulfate concentration in the sample. The results are advisory. No corrective action was taken.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

A duplicate was prepared in conjunction with sample GW-124+00-2-103017-(20). The duplicate RPD was within QC limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sampe GW-124+00-2-103017-(20). The duplicate RPD was within QC limits.

#### **Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample GW-124+00-2-103017-(20). The duplicate has high RPD. The matrix spike has a natural concentration of Carbon that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The DOC has been flagged with an "HC" qualifier on the matrix spike. The results is likely a homogeneity issue, and was reanalyzed to verify. The parent sample concentration is high compared to the matrix spike concentration. These results may be variable due to particitate formation during the analysis. The results are advisory. No further corrective action was taken.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**GW-131+00-2-102717**  
**17J0562-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 13:00  
Analyzed: 03-Nov-2017 13:51

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 1 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 109   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 84.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105   | %     |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-131+00-2-102717-(20)**  
**17J0562-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/27/2017 13:00  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>15800</b> | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-131+00-2-102717-(20)**  
**17J0562-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 13:00  
Analyzed: 30-Oct-2017 21:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | H, U  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
21-Nov-2017 12:51

**GW-131+00-2-102717-(20)**  
**17J0562-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/27/2017 13:00

Instrument: Accumet AR60

Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1180</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-----------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>87.0</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1260</b> | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-131+00-2-102717-(20)**  
**17J0562-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/27/2017 13:00  
Analyzed: 16-Nov-2017 20:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>115</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-131+00-2-102717-(20)**  
**17J0562-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 13:00  
Analyzed: 31-Oct-2017 12:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>2.30</b> | mg-P/L | H, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
21-Nov-2017 12:51

**GW-131+00-2-102717-(20)**  
**17J0562-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 13:00  
Analyzed: 08-Nov-2017 15:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>545</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-131+00-2-102717-(20)**  
**17J0562-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 13:00  
Analyzed: 08-Nov-2017 20:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>9460</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-131+00-2-102717-(20)**  
**17J0562-02RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/27/2017 13:00  
Analyzed: 09-Nov-2017 00:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>24.3</b> | mg/L  | D     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**GW-129+65-0-103017**  
**17J0562-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 09:40  
Analyzed: 03-Nov-2017 15:40

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.04</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 117   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 94.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 86.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 105   | %     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-0-103017-(20)**  
**17J0562-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 09:40  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>16600</b> | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-0-103017-(20)**  
**17J0562-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 09:40  
Analyzed: 30-Oct-2017 21:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>0.101</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
21-Nov-2017 12:51

**GW-129+65-0-103017-(20)**  
**17J0562-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/30/2017 09:40  
Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 92.4   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 92.4   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-0-103017-(20)**  
**17J0562-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 09:40  
Analyzed: 16-Nov-2017 21:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.91</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-129+65-0-103017-(20)**  
**17J0562-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 09:40  
Analyzed: 31-Oct-2017 12:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.567</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-129+65-0-103017-(20)**  
**17J0562-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 09:40  
Analyzed: 08-Nov-2017 16:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1430</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-129+65-0-103017-(20)**  
**17J0562-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 09:40  
Analyzed: 08-Nov-2017 20:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>10200</b> | mg/L  | D     |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-129+65-0-103017-(20)**  
**17J0562-04RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 09:40  
Analyzed: 09-Nov-2017 01:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>34.2</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**GW-128+30-0-103017**  
**17J0562-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 11:00  
Analyzed: 03-Nov-2017 16:01

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 125   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 82.5  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 110   | %     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-128+30-0-103017-(20)**  
**17J0562-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 11:00  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>21000</b> | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-128+30-0-103017-(20)**  
**17J0562-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:00  
Analyzed: 30-Oct-2017 21:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-128+30-0-103017-(20)**  
**17J0562-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/30/2017 11:00  
Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062 Sample Size: 100 mL  
Prepared: 02-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>100</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>100</b> | mg/L CaCO3 |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-0-103017-(20)**  
**17J0562-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 11:00  
Analyzed: 16-Nov-2017 22:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.80</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-0-103017-(20)**  
**17J0562-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:00  
Analyzed: 31-Oct-2017 12:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.543</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-0-103017-(20)**  
**17J0562-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:00  
Analyzed: 08-Nov-2017 16:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1760</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-0-103017-(20)**  
**17J0562-06RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:00  
Analyzed: 08-Nov-2017 20:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>12200</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-0-103017-(20)**  
**17J0562-06RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:00  
Analyzed: 09-Nov-2017 01:38

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>42.6</b> | mg/L  | D     |



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Reported:  
21-Nov-2017 12:51

**GW-128+30-2-103017**  
**17J0562-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 11:45  
Analyzed: 03-Nov-2017 16:21

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.06</b> | ug/L  | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 119   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 96.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 85.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 105   | %     |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-2-103017-(20)**  
**17J0562-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 11:45  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>10000</b> | mg/L  |       |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-2-103017-(20)**  
**17J0562-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:45  
Analyzed: 30-Oct-2017 22:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.143</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-2-103017-(20)**  
**17J0562-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/30/2017 11:45

Instrument: Accumet AR60

Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 593    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 593    | mg/L CaCO3 |       |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-2-103017-(20)**  
**17J0562-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 11:45  
Analyzed: 16-Nov-2017 22:41

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>12.4</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-2-103017-(20)**  
**17J0562-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:45  
Analyzed: 31-Oct-2017 13:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>1.59</b> | mg-P/L | D     |





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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-2-103017-(20)**  
**17J0562-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:45  
Analyzed: 08-Nov-2017 16:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>613</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-2-103017-(20)**  
**17J0562-08RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:45  
Analyzed: 08-Nov-2017 21:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>5740</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-128+30-2-103017-(20)**  
**17J0562-08RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:45  
Analyzed: 09-Nov-2017 01:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>16.8</b> | mg/L  | D     |



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Reported:  
21-Nov-2017 12:51

**GW-129+65-2-103017**  
**17J0562-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 11:50  
Analyzed: 03-Nov-2017 16:41

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 122   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 86.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 108   | %     |



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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-2-103017-(20)**  
**17J0562-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 11:50  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>16400</b> | mg/L  |       |



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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-2-103017-(20)**  
**17J0562-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:50  
Analyzed: 30-Oct-2017 22:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Reported:  
21-Nov-2017 12:51

**GW-129+65-2-103017-(20)**  
**17J0562-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/30/2017 11:50

Instrument: Accumet AR60

Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 339    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 339    | mg/L CaCO3 |       |



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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-2-103017-(20)**  
**17J0562-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 11:50  
Analyzed: 16-Nov-2017 23:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>8.89</b> | mg/L  | D     |





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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-2-103017-(20)**  
**17J0562-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:50  
Analyzed: 31-Oct-2017 13:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.52</b> | mg-P/L | D     |



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Project Number: 79227  
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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-2-103017-(20)**  
**17J0562-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:50  
Analyzed: 08-Nov-2017 17:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1280</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-129+65-2-103017-(20)**  
**17J0562-10RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:50  
Analyzed: 08-Nov-2017 21:39

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>9800</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-129+65-2-103017-(20)**  
**17J0562-10RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 11:50  
Analyzed: 10-Nov-2017 10:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>33.1</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
21-Nov-2017 12:51

**GW-126+90-2-103017**  
**17J0562-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 13:00  
Analyzed: 03-Nov-2017 17:01

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.09</b> | ug/L  | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 127   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 93.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 86.0  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 107   | %     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-126+90-2-103017-(20)**  
**17J0562-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 13:00  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>21600</b> | mg/L  |       |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-126+90-2-103017-(20)**  
**17J0562-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:00  
Analyzed: 30-Oct-2017 22:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-126+90-2-103017-(20)**  
**17J0562-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/30/2017 13:00

Instrument: Accumet AR60

Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 135    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 135    | mg/L CaCO3 |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-126+90-2-103017-(20)**  
**17J0562-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 13:00  
Analyzed: 16-Nov-2017 23:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.14</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-126+90-2-103017-(20)**  
**17J0562-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:00  
Analyzed: 31-Oct-2017 13:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.529</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



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**Reported:**  
21-Nov-2017 12:51

**GW-126+90-2-103017-(20)**  
**17J0562-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:00  
Analyzed: 08-Nov-2017 17:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1870</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-126+90-2-103017-(20)**  
**17J0562-12RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:00  
Analyzed: 08-Nov-2017 21:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>14000</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-126+90-2-103017-(20)**  
**17J0562-12RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:00  
Analyzed: 09-Nov-2017 02:39

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>33.4</b> | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
21-Nov-2017 12:51

**GW-125+50-2-103017**  
**17J0562-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 13:30  
Analyzed: 03-Nov-2017 17:22

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.17</b> | ug/L  | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 124   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.4  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 83.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 109   | %     |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-125+50-2-103017-(20)**  
**17J0562-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 13:30  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>21500</b> | mg/L  |       |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-125+50-2-103017-(20)**  
**17J0562-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:30  
Analyzed: 30-Oct-2017 23:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |





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Reported:  
21-Nov-2017 12:51

**GW-125+50-2-103017-(20)**  
**17J0562-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/30/2017 13:30  
Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062 Sample Size: 100 mL  
Prepared: 02-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |



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**Reported:**  
21-Nov-2017 12:51

**GW-125+50-2-103017-(20)**  
**17J0562-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 13:30  
Analyzed: 16-Nov-2017 23:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.41</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-125+50-2-103017-(20)**  
**17J0562-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:30  
Analyzed: 31-Oct-2017 14:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



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**Reported:**  
21-Nov-2017 12:51

**GW-125+50-2-103017-(20)**  
**17J0562-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:30  
Analyzed: 08-Nov-2017 17:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1850</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-125+50-2-103017-(20)**  
**17J0562-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:30  
Analyzed: 08-Nov-2017 22:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>13100</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-125+50-2-103017-(20)**  
**17J0562-14RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 13:30  
Analyzed: 09-Nov-2017 03:41

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | 45.4   | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
21-Nov-2017 12:51

**GW-124+00-2-103017**  
**17J0562-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 14:30  
Analyzed: 03-Nov-2017 13:27

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 1 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | <b>0.93</b> | ug/L   | J     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND          | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 106 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 93.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 86.0 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 103 %  |       |



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Olympia WA, 98503

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**Reported:**  
21-Nov-2017 12:51

**GW-124+00-2-103017-(20)**  
**17J0562-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 14:30  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>19200</b> | mg/L  |       |





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**Reported:**  
21-Nov-2017 12:51

**GW-124+00-2-103017-(20)**  
**17J0562-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 14:30  
Analyzed: 31-Oct-2017 00:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-124+00-2-103017-(20)**  
**17J0562-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/30/2017 14:30  
Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>2000</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-----------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>37.3</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>2040</b> | mg/L CaCO3 |       |



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**Reported:**  
21-Nov-2017 12:51

**GW-124+00-2-103017-(20)**  
**17J0562-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 14:30  
Analyzed: 17-Nov-2017 00:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 10       | 5.00            | <b>405</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-124+00-2-103017-(20)**  
**17J0562-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 14:30  
Analyzed: 31-Oct-2017 15:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>1.11</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>6.55</b> | mg-P/L | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-124+00-2-103017-(20)**  
**17J0562-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 14:30  
Analyzed: 08-Nov-2017 18:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | <b>395</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-124+00-2-103017-(20)**  
**17J0562-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 14:30  
Analyzed: 08-Nov-2017 22:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 4000     | 400             | <b>10800</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-124+00-2-103017-(20)**  
**17J0562-16RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 14:30  
Analyzed: 09-Nov-2017 04:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>16.6</b> | mg/L  | D     |



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Reported:  
21-Nov-2017 12:51

**GW-6E3-2-103017**  
**17J0562-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 15:15  
Analyzed: 03-Nov-2017 17:42

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | 5.77     | ug/L  |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | 1.59     | ug/L  |       |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | 6.65     | ug/L  |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | 1.56     | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 112   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 91.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 88.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105   | %     |





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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017**  
**17J0562-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/30/2017 15:15  
Analyzed: 13-Nov-2017 22:34

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0074 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | <b>2.02</b> | ug/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017**  
**17J0562-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/30/2017 15:15  
Analyzed: 14-Nov-2017 16:38

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0074 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 2000     | 44.0            | 400             | <b>247000</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | <b>18.7</b>   | ug/L  | D     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>131</b>    | ug/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017**  
**17J0562-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/30/2017 15:15  
Analyzed: 08-Nov-2017 16:48

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0208  
Prepared: 08-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/30/2017 15:15  
Analyzed: 10-Nov-2017 15:06

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 10       | 0.0850          | 0.500           | ND     | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 10       | 0.0510          | 0.500           | 351    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 50       | 0.0650          | 2.50            | 580    | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 10       | 0.160           | 0.500           | 445    | mg/L  | D     |
| Manganese, Dissolved | 7439-96-5  | 50       | 0.0170          | 0.0500          | 4.34   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 10       | 0.520           | 5.00            | 222    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 10       | 0.0520          | 0.600           | 21.9   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 10       | 19.0            | 500             | 9350   | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 10/30/2017 15:15  
Analyzed: 09-Nov-2017 04:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 10/30/2017 15:15  
Analyzed: 09-Nov-2017 18:39

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0071 Sample Size: 25 mL  
Prepared: 03-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 500      | 11.0            | 100             | <b>100000</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND            | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | <b>68.3</b>   | ug/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 10/30/2017 15:15  
Analyzed: 08-Nov-2017 14:45

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0133  
Prepared: 06-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 15:15  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26800</b> | mg/L  |       |





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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 15:15  
Analyzed: 31-Oct-2017 01:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Reported:  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/30/2017 15:15  
Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 680    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 680    | mg/L CaCO3 |       |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 15:15  
Analyzed: 31-Oct-2017 16:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18RE1 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 15:15  
Analyzed: 17-Nov-2017 17:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>110</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 15:15  
Analyzed: 08-Nov-2017 19:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>647</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 15:15  
Analyzed: 09-Nov-2017 00:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>16900</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-6E3-2-103017-(20)**  
**17J0562-18RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 15:15  
Analyzed: 09-Nov-2017 05:01

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>8.94</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 20       | 2.00            | <b>2.63</b> | mg/L  | D     |



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Reported:  
21-Nov-2017 12:51

**GW-121+80-2-103017**  
**17J0562-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/30/2017 15:40  
Analyzed: 03-Nov-2017 15:00

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 1 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 116   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 83.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105   | %     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-121+80-2-103017-(20)**  
**17J0562-20 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/30/2017 15:40  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>8480</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-121+80-2-103017-(20)**  
**17J0562-20 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 15:40  
Analyzed: 31-Oct-2017 01:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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**Reported:**  
21-Nov-2017 12:51

**GW-121+80-2-103017-(20)**  
**17J0562-20 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/30/2017 15:40  
Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1330</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>611</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1940</b> | mg/L CaCO3 |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-121+80-2-103017-(20)**  
**17J0562-20 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 15:40  
Analyzed: 17-Nov-2017 01:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 10       | 5.00            | <b>205</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**GW-121+80-2-103017-(20)**  
**17J0562-20RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 15:40  
Analyzed: 31-Oct-2017 16:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870  
Prepared: 30-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>6.56</b> | mg/L  | D     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>2.89</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>8.41</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>5.97</b> | mg/L  | D     |



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**Reported:**  
21-Nov-2017 12:51

**GW-121+80-2-103017-(20)**  
**17J0562-20RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/30/2017 15:40  
Analyzed: 09-Nov-2017 00:38

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0870 Sample Size: 5 mL  
Prepared: 30-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>4470</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**Trip Blank**  
**17J0562-21 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/27/2017 00:00  
Analyzed: 03-Nov-2017 13:07

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 102   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 88.2  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**Volatile Organic Compounds - Quality Control**

**Batch BFK0092 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|--------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0092-BLK1)</b>       |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 12:29 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  |        | 5.12            |                    | ug/L  | 5.00        |   | 102  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.62            |                    | ug/L  | 5.00        |   | 92.5 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.34            |                    | ug/L  | 5.00        |   | 86.9 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 5.32            |                    | ug/L  | 5.00        |   | 106  | 80-120      |      |           |       |
| <b>LCS (BFK0092-BS1)</b>          |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 10:39 |      |             |      |           |       |
| Vinyl Chloride                    | 10.0   | 0.06            | 0.20               | ug/L  | 10.0        |   | 100  | 66-133      |      |           |       |
| Chloroform                        | 9.76   | 0.03            | 0.20               | ug/L  | 10.0        |   | 97.6 | 80-122      |      |           |       |
| Trichloroethene                   | 9.57   | 0.05            | 0.20               | ug/L  | 10.0        |   | 95.7 | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.1   | 0.05            | 0.20               | ug/L  | 10.0        |   | 101  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   |        | 4.82            |                    | ug/L  | 5.00        |   | 96.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.62            |                    | ug/L  | 5.00        |   | 92.3 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.98            |                    | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.83            |                    | ug/L  | 5.00        |   | 96.5 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 4.79            |                    | ug/L  | 5.00        |   | 95.8 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0092-BSD1)</b>     |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 12:09 |      |             |      |           |       |
| Vinyl Chloride                    | 10.1   | 0.06            | 0.20               | ug/L  | 10.0        |   | 101  | 66-133      | 1.01 | 30        |       |
| Chloroform                        | 9.64   | 0.03            | 0.20               | ug/L  | 10.0        |   | 96.4 | 80-122      | 1.15 | 30        |       |
| Trichloroethene                   | 9.66   | 0.05            | 0.20               | ug/L  | 10.0        |   | 96.6 | 80-120      | 0.96 | 30        |       |
| Tetrachloroethene                 | 9.77   | 0.05            | 0.20               | ug/L  | 10.0        |   | 97.7 | 80-120      | 2.98 | 30        |       |
| Surrogate: Dibromofluoromethane   |        | 4.82            |                    | ug/L  | 5.00        |   | 96.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  |        | 4.41            |                    | ug/L  | 5.00        |   | 88.2 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             |        | 4.98            |                    | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   |        | 4.88            |                    | ug/L  | 5.00        |   | 97.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 |        | 5.02            |                    | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <b>Matrix Spike (BFK0092-MS1)</b> |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 | Source: 17J0562-15 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 20:45 |      |             |      |           |       |
| Vinyl Chloride                    | 93.7   | 0.57            | 2.00               | ug/L  | 100         | 0.93  | 92.7 | 66-133      |      |           |       |
| Chloroform                        | 106    | 0.27            | 2.00               | ug/L  | 100         | ND  | 106  | 80-122      |      |           |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**Volatile Organic Compounds - Quality Control**

**Batch BFK0092 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                        | Result | Detection Limit           | Reporting Limit | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|--|--------|---------------------------|-----------------|-------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFK0092-MS1)</b>        |        | <b>Source: 17J0562-15</b> |                 |       | Prepared: 03-Nov-2017 |               | Analyzed: 03-Nov-2017 20:45 |             |     |           |       |
| Trichloroethene                          | 98.4   | 0.49                      | 2.00            | ug/L  | 100                   | ND            | 98.4                        | 80-120      |     |           |       |
| Tetrachloroethene                        | 98.6   | 0.47                      | 2.00            | ug/L  | 100                   | ND            | 98.6                        | 80-120      |     |           |       |
| <i>Surrogate: Dibromofluoromethane</i>   |        | 5.21                      |                 | ug/L  | 5.00                  |               | 104                         | 80-120      |     |           |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |        | 5.33                      |                 | ug/L  | 5.00                  | 5.29          | 107                         | 80-129      |     |           |       |
| <i>Surrogate: Toluene-d8</i>             |        | 5.11                      |                 | ug/L  | 5.00                  | 4.69          | 102                         | 80-120      |     |           |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |        | 4.85                      |                 | ug/L  | 5.00                  | 4.30          | 97.1                        | 80-120      |     |           |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |        | 4.98                      |                 | ug/L  | 5.00                  | 5.15          | 99.5                        | 80-120      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|  |      |                           |      |      |                       |      |                             |        |      |    |  |
|--|------|---------------------------|------|------|-----------------------|------|-----------------------------|--------|------|----|--|
| <b>Matrix Spike Dup (BFK0092-MSD1)</b>   |      | <b>Source: 17J0562-15</b> |      |      | Prepared: 03-Nov-2017 |      | Analyzed: 03-Nov-2017 21:05 |        |      |    |  |
| Vinyl Chloride                           | 102  | 0.57                      | 2.00 | ug/L | 100                   | 0.93 | 101                         | 66-133 | 8.67 | 30 |  |
| Chloroform                               | 102  | 0.27                      | 2.00 | ug/L | 100                   | ND   | 102                         | 80-122 | 3.44 | 30 |  |
| Trichloroethene                          | 97.2 | 0.49                      | 2.00 | ug/L | 100                   | ND   | 97.2                        | 80-120 | 1.21 | 30 |  |
| Tetrachloroethene                        | 96.1 | 0.47                      | 2.00 | ug/L | 100                   | ND   | 96.1                        | 80-120 | 2.54 | 30 |  |
| <i>Surrogate: Dibromofluoromethane</i>   |      | 5.00                      |      | ug/L | 5.00                  |      | 100                         | 80-120 |      |    |  |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |      | 5.06                      |      | ug/L | 5.00                  | 5.29 | 101                         | 80-129 |      |    |  |
| <i>Surrogate: Toluene-d8</i>             |      | 5.25                      |      | ug/L | 5.00                  | 4.69 | 105                         | 80-120 |      |    |  |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |      | 4.75                      |      | ug/L | 5.00                  | 4.30 | 95.0                        | 80-120 |      |    |  |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |      | 5.04                      |      | ug/L | 5.00                  | 5.15 | 101                         | 80-120 |      |    |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0074 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0074-BLK1)</b> |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 16:54 |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0074-BS1)</b>    |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 07-Nov-2017 17:15 |               |      |             |     |           |       |
| Lead                        | 208     | 25.8   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 103  | 80-120      |     |           |       |
| Arsenic                     | 75a     | 25.4   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 102  | 80-120      |     |           |       |
| Copper                      | 63      | 27.2   | 0.340           | 0.500           | ug/L  | 25.0  |               | 109  | 80-120      |     |           |       |
| Copper                      | 65      | 27.7   | 0.350           | 0.500           | ug/L  | 25.0  |               | 111  | 80-120      |     |           |       |
| Nickel                      | 60      | 27.2   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 109  | 80-120      |     |           |       |
| Nickel                      | 62      | 26.9   | 0.220           | 0.500           | ug/L  | 25.0  |               | 108  | 80-120      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0208 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0208-BLK1)</b> |         |                 |       |             | Prepared: 08-Nov-2017 Analyzed: 08-Nov-2017 16:38 |      |             |     |           |       |
| Mercury                     | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0208-BS1)</b>    |         |                 |       |             | Prepared: 08-Nov-2017 Analyzed: 08-Nov-2017 16:46 |      |             |     |           |       |
| Mercury                     | 0.00222 | 0.000100        | mg/L  | 0.00200     |   | 111  | 80-120      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0071 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0071-BLK1)</b>       |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 04:04                    |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |      |             |      |           | U     |
| Arsenic, Dissolved                | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |      |           | U     |
| Copper, Dissolved                 | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |      |             |      |           | U     |
| Copper, Dissolved                 | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |      |             |      |           | U     |
| Nickel, Dissolved                 | 60      | ND     | 0.0500          | 0.500           | ug/L  |  |               |      |             |      |           | U     |
| Nickel, Dissolved                 | 62      | ND     | 0.220           | 0.500           | ug/L  |  |               |      |             |      |           | U     |
| <b>LCS (BFK0071-BS1)</b>          |         |        |                 |                 |       | Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 04:57                    |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | 29.7   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 119  | 80-120      |      |           |       |
| Arsenic, Dissolved                | 75a     | 25.3   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 101  | 80-120      |      |           |       |
| Copper, Dissolved                 | 63      | 28.6   | 0.340           | 0.500           | ug/L  | 25.0   |               | 114  | 80-120      |      |           |       |
| Copper, Dissolved                 | 65      | 27.6   | 0.350           | 0.500           | ug/L  | 25.0   |               | 111  | 80-120      |      |           |       |
| Nickel, Dissolved                 | 60      | 27.8   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 111  | 80-120      |      |           |       |
| Nickel, Dissolved                 | 62      | 27.8   | 0.220           | 0.500           | ug/L  | 25.0   |               | 111  | 80-120      |      |           |       |
| <b>Duplicate (BFK0071-DUP1)</b>   |         |        |                 |                 |       | Source: 17J0562-18 Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 04:08 |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | ND     | 1.36            | 2.00            | ug/L  |  | ND            |      |             |      |           | U     |
| Copper, Dissolved                 | 63      | ND     | 6.80            | 10.0            | ug/L  |  | ND            |      |             |      |           | U     |
| Nickel, Dissolved                 | 60      | 70.5   | 1.00            | 10.0            | ug/L  |  | 68.3          |      |             | 3.26 | 20        | D     |
| <b>Duplicate (BFK0071-DUP2)</b>   |         |        |                 |                 |       | Source: 17J0562-18 Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 18:34 |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | 107000 | 11.0            | 100             | ug/L  |  | 100000        |      |             | 6.40 | 20        | D     |
| <b>Matrix Spike (BFK0071-MS1)</b> |         |        |                 |                 |       | Source: 17J0562-18 Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 04:18 |               |      |             |      |           |       |
| Lead, Dissolved                   | 208     | 28.6   | 1.36            | 2.00            | ug/L  | 25.0   | ND            | 114  | 75-125      |      |           | D     |
| Copper, Dissolved                 | 63      | 25.4   | 6.80            | 10.0            | ug/L  | 25.0   | ND            | 101  | 75-125      |      |           | D     |
| Nickel, Dissolved                 | 60      | 98.3   | 1.00            | 10.0            | ug/L  | 25.0   | 68.3          | 120  | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |     |       |      |     |      |  |        |    |        |  |  |       |
|-----------------------------------|-----|-------|------|-----|------|--|--------|----|--------|--|--|-------|
| <b>Matrix Spike (BFK0071-MS2)</b> |     |       |      |     |      | Source: 17J0562-18 Prepared: 03-Nov-2017 Analyzed: 09-Nov-2017 18:44 |        |    |        |  |  |       |
| Arsenic, Dissolved                | 75a | 98100 | 11.0 | 100 | ug/L | 25.0   | 100000 | NR | 75-125 |  |  | HC, D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0133 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0133-BLK1)</b> |         |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:33 |      |             |     |           |       |
| Mercury, Dissolved          | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0133-BS1)</b>    |         |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:35 |      |             |     |           |       |
| Mercury, Dissolved          | 0.00229 | 0.000100        | mg/L  | 0.00200     |   | 115  | 80-120      |     |           |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0238 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0238-BLK1)</b> |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 14:05 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Arsenic, Dissolved          | ND     | 0.0047          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0722 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |
| <b>Blank (BFK0238-BLK2)</b> |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 13-Nov-2017 11:57 |      |             |     |           |       |
| Iron, Dissolved             | 0.0088 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0126 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0238-BS1)</b>    |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 13:40 |      |             |     |           |       |
| Aluminum, Dissolved         | 2.05   | 0.0085          | 0.0500          | mg/L  | 2.00        |   | 103  | 80-120      |     |           |       |
| Arsenic, Dissolved          | 2.06   | 0.0047          | 0.0500          | mg/L  | 2.00        |   | 103  | 80-120      |     |           |       |
| Calcium, Dissolved          | 9.82   | 0.0051          | 0.0500          | mg/L  | 10.0        |   | 98.2 | 80-120      |     |           |       |
| Iron, Dissolved             | 1.96   | 0.0013          | 0.0500          | mg/L  | 2.00        |   | 98.0 | 80-120      |     |           |       |
| Magnesium, Dissolved        | 10.4   | 0.0160          | 0.0500          | mg/L  | 10.0        |   | 104  | 80-120      |     |           |       |
| Manganese, Dissolved        | 0.468  | 0.0003          | 0.0010          | mg/L  | 0.500       |   | 93.6 | 80-120      |     |           |       |
| Potassium, Dissolved        | 9.40   | 0.0520          | 0.500           | mg/L  | 10.0        |   | 94.0 | 80-120      |     |           |       |
| Silicon, Dissolved          | 9.72   | 0.0052          | 0.0600          | mg/L  | 10.0        |   | 97.2 | 80-120      |     |           |       |
| Sodium, Dissolved           | 9.88   | 0.0114          | 0.500           | mg/L  | 10.0        |   | 98.8 | 80-120      |     |           |       |
| Sodium, Dissolved           | 10.1   | 1.90            | 50.0            | mg/L  | 10.0        |   | 101  | 80-120      |     |           | J     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

Wet Chemistry - Quality Control

Batch BFJ0870 - No Prep Wet Chem

Instrument: DX2100 Analyst: CDE

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units  | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|--------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0870-BLK1)</b>     |        | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 20:34 |        |   |               |      |             |      |           |       |
| Bromide                         | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Fluoride                        | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| <b>Blank (BFJ0870-BLK2)</b>     |        | Prepared: 30-Oct-2017 Analyzed: 31-Oct-2017 11:32 |        |   |               |      |             |      |           |       |
| Bromide                         | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Chloride                        | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Fluoride                        | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| Orthophosphorus                 | ND     | 0.10  | mg-P/L |   |               |      |             |      |           | U     |
| Sulfate                         | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| <b>LCS (BFJ0870-BS1)</b>        |        | Prepared: 30-Oct-2017 Analyzed: 30-Oct-2017 20:53 |        |   |               |      |             |      |           |       |
| Fluoride                        | 1.53   | 0.100   | mg/L   | 1.50  |               | 102  | 90-110      |      |           |       |
| Nitrate-N                       | 1.53   | 0.100   | mg-N/L | 1.50  |               | 102  | 90-110      |      |           |       |
| Nitrite-N                       | 1.54   | 0.100   | mg-N/L | 1.50  |               | 102  | 90-110      |      |           |       |
| <b>LCS (BFJ0870-BS2)</b>        |        | Prepared: 30-Oct-2017 Analyzed: 31-Oct-2017 11:52 |        |   |               |      |             |      |           |       |
| Bromide                         | 1.49   | 0.100   | mg/L   | 1.50  |               | 99.5 | 90-110      |      |           |       |
| Chloride                        | 1.51   | 0.100   | mg/L   | 1.50  |               | 101  | 90-110      |      |           |       |
| Fluoride                        | 1.54   | 0.100   | mg/L   | 1.50  |               | 103  | 90-110      |      |           |       |
| Nitrite-N                       | 1.52   | 0.100   | mg-N/L | 1.50  |               | 101  | 90-110      |      |           |       |
| Orthophosphorus                 | 1.40   | 0.10  | mg-P/L | 1.50  |               | 93.2 | 90-110      |      |           |       |
| Sulfate                         | 1.56   | 0.100   | mg/L   | 1.50  |               | 104  | 90-110      |      |           |       |
| <b>Duplicate (BFJ0870-DUP1)</b> |        | Source: 17J0562-16                                |        | Prepared: 30-Oct-2017 Analyzed: 31-Oct-2017 00:34 |               |      |             |      |           |       |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |   | ND            |      |             |      |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |   | ND            |      |             |      |           | U     |
| <b>Duplicate (BFJ0870-DUP2)</b> |        | Source: 17J0562-16RE1                             |        | Prepared: 30-Oct-2017 Analyzed: 31-Oct-2017 15:33 |               |      |             |      |           |       |
| Fluoride                        | 1.16   | 0.500   | mg/L   |   | 1.11          |      |             | 4.24 | 20        | D     |
| Orthophosphorus                 | 6.70   | 0.50  | mg-P/L |   | 6.55          |      |             | 2.37 | 20        | D     |
| <b>Duplicate (BFJ0870-DUP3)</b> |        | Source: 17J0562-16RE3                             |        | Prepared: 30-Oct-2017 Analyzed: 08-Nov-2017 23:38 |               |      |             |      |           |       |
| Chloride                        | 11000  | 400   | mg/L   |   | 10800         |      |             | 1.96 | 20        | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

### Wet Chemistry - Quality Control

#### Batch BFJ0870 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Duplicate (BFJ0870-DUP4)</b> Source: 17J0562-16RE3 Prepared: 30-Oct-2017 Analyzed: 08-Nov-2017 23:58   |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 11000  | 400             | mg/L   |             | 10800         |      |             | 1.92 | 20        | D     |
| <b>Duplicate (BFJ0870-DUP5)</b> Source: 17J0562-16RE4 Prepared: 30-Oct-2017 Analyzed: 09-Nov-2017 04:22   |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 16.6   | 1.00            | mg/L   |             | 16.6          |      |             | 0.08 | 20        | D     |
| <b>Duplicate (BFJ0870-DUP6)</b> Source: 17J0562-16RE2 Prepared: 30-Oct-2017 Analyzed: 08-Nov-2017 18:33   |        |                 |        |             |               |      |             |      |           |       |
| Sulfate   | 401    | 20.0            | mg/L   |             | 395           |      |             | 1.70 | 20        | D     |
| <b>Matrix Spike (BFJ0870-MS1)</b> Source: 17J0562-16 Prepared: 30-Oct-2017 Analyzed: 31-Oct-2017 00:55    |        |                 |        |             |               |      |             |      |           |       |
| Nitrate-N   | 1.70   | 0.100           | mg-N/L | 2.00        | ND            | 85.0 | 75-125      |      |           |       |
| Nitrite-N   | 0.674  | 0.100           | mg-N/L | 2.00        | ND            | 33.7 | 75-125      |      |           | *     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0870-MS2)</b> Source: 17J0562-16RE1 Prepared: 30-Oct-2017 Analyzed: 31-Oct-2017 15:54 |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 3.11   | 0.500           | mg/L   | 2.00        | 1.11          | 100  | 75-125      |      |           | D     |
| Orthophosphorus   | 8.59   | 0.50            | mg-P/L | 2.00        | 6.55          | 102  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0870-MS3)</b> Source: 17J0562-16RE4 Prepared: 30-Oct-2017 Analyzed: 09-Nov-2017 04:42 |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 33.2   | 2.00            | mg/L   | 20.0        | 16.6          | 83.1 | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFJ0870-MS4)</b> Source: 17J0562-16RE2 Prepared: 30-Oct-2017 Analyzed: 08-Nov-2017 19:35 |        |                 |        |             |               |      |             |      |           |       |
| Sulfate   | 886    | 50.0            | mg/L   | 500         | 395           | 98.4 | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

Wet Chemistry - Quality Control

Batch BFK0062 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit    | Units      | Spike Level | Source Result                                     | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|---------------------------------|--------|--------------------|------------|-------------|---|------|--------------|------|-----------|-------|
| <b>Blank (BFK0062-BLK1)</b>     |        |                    |            |             |   |      |              |      |           |       |
|                                 |        |                    |            |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:10 |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00               | mg/L CaCO3 |             |   |      |              |      |           | U     |
| <b>Blank (BFK0062-BLK2)</b>     |        |                    |            |             |   |      |              |      |           |       |
|                                 |        |                    |            |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 16:30 |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00               | mg/L CaCO3 |             |   |      |              |      |           | U     |
| <b>Duplicate (BFK0062-DUP1)</b> |        |                    |            |             |   |      |              |      |           |       |
|                                 |        | Source: 17J0562-16 |            |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:10 |      |              |      |           |       |
| Alkalinity, Total               | 2030   | 1.00               | mg/L CaCO3 |             | 2040  |      |              | 0.61 | 20        |       |
| <b>Reference (BFK0062-SRM1)</b> |        |                    |            |             |   |      |              |      |           |       |
|                                 |        |                    |            |             | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:10 |      |              |      |           |       |
| Alkalinity, Total               | 107    | 1.00               | mg/L CaCO3 | 108         |   | 98.8 | 90.37-108.33 |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
21-Nov-2017 12:51

**Wet Chemistry - Quality Control**

**Batch BFK0080 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0080-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:22 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFK0080-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:22 |      |             |      |           |       |
| Dissolved Solids                | 502    | 5.0                       | mg/L  | 500         |   | 100  | 90-110      |      |           |       |
| <b>Duplicate (BFK0080-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17J0562-16</b> |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:22 |      |             |      |           |       |
| Dissolved Solids                | 20000  | 200                       | mg/L  |             | 19200   |      |             | 4.09 | 20        |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**Wet Chemistry - Quality Control**

**Batch BFK0431 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte                   | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-------------------------------------|--------|---|-------|---|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFK0431-BLK1)</b>         |        | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 20:01 |       |   |               |      |             |       |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 1.00  | mg/L  |   |               |      |             |       |           | U     |
| <b>LCS (BFK0431-BS1)</b>            |        | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 20:24 |       |   |               |      |             |       |           |       |
| Dissolved Organic Carbon, Dissolved | 19.5   | 1.00  | mg/L  | 20.0  |               | 97.6 | 90-110      |       |           | D     |
| <b>Duplicate (BFK0431-DUP1)</b>     |        | <b>Source: 17J0562-16</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 00:42 |               |      |             |       |           |       |
| Dissolved Organic Carbon, Dissolved | 199    | 5.00  | mg/L  |   | 405           |      |             | 68.10 | 20        | *, D  |
| <b>Matrix Spike (BFK0431-MS1)</b>   |        | <b>Source: 17J0562-16</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 01:04 |               |      |             |       |           |       |
| Dissolved Organic Carbon, Dissolved | 322    | 5.00  | mg/L  | 20.0  | 405           | NR   | 75-125      |       |           | HC, D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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Reported:  
21-Nov-2017 12:51

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
21-Nov-2017 12:51

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



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**Reported:**  
21-Nov-2017 12:51

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
21-Nov-2017 12:51

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- H Hold time violation - Hold time was exceeded.
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.





29 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0578

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



Date: 10.31.17  
Page: 2 of 2  
No. of Coolers: 2  
Cooler Temps: \_\_\_\_\_

ARI Assigned Number: \_\_\_\_\_ Normal  
ARI Client Company: Pioneer Technologies  
Client Contact: Troy Bussey (busseyt@uspioneer.com)  
Client Project Name: Arkema FS DG Inv  
Client Project #: 79227  
Samplers: D Cooper 206-660-3466  
T Dreher / L Kerner / D Pickering

| Sample ID   | Date     | Time | Matrix | No. Containers | Analysis Requested                          |   |  |   |   |  |                                      |                            | Notes/Comments |   |
|---|----------|------|--------|----------------|---|---|--|---|---|--|--------------------------------------|----------------------------|----------------|---|
|   |          |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |                |   |
| GW-126+90-3-103117-(20)   | 10.31.17 | 1215 | water  | 3              |   |   |  |   | X   | X  | X                                    | X                          | X              | All dissolved samples field filtered 0.45µM |
| GW-126+90-3-103117-(01)   |          | 1220 |        |                |   | X   |  |   |   |  |                                      |                            |                |   |
| GW-126+90-3-103117-(21)   |          | 1220 |        |                | X   |   |  |   |   |  |                                      |                            |                |   |
| GW-120+75-2-103117  |          | 1300 |        |                |   | X   |  |   |   |  |                                      |                            |                |   |
| GW-120+75-2-103117-(20)   |          | 1300 |        |                |   |   | X  |   |   |  |                                      |                            |                |   |
|   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
|   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
|   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
|   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
|   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
|   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
| Comments/Special Instructions<br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
| Relinquished by: <i>Duk</i><br>(Signature)<br>Printed Name: _____   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
| Relinquished by: <i>Luhehuw</i><br>(Signature)<br>Printed Name: _____   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
| Relinquished by: <i>DOF</i><br>(Signature)<br>Printed Name: _____   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
| Relinquished by: <i>ARI</i><br>(Signature)<br>Printed Name: _____   |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
| Relinquished by: <i>10.31.17</i><br>(Signature)<br>Printed Name: _____  |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
| Received by: <i>10/31/2017 1505</i><br>(Signature)<br>Printed Name: _____                                       |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |
| Received by: <i>10/31/2017 1505</i><br>(Signature)<br>Printed Name: _____                                       |          |      |        |                |   |   |  |   |   |  |                                      |                            |                |   |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **Normal**

ARI Client Company: **Pioneer Technologies**

Client Contact: **Troy Bussey (busseyt@uspioneer.com)**

Client Project Name: **Arkema FS DG Inv**

Client Project #: **79227**

Turn-around Requested: **Normal**

Phone: **360-570-1700**

Samplers: **D Cooper 206-660-3466 / T Dreher / L Kerner / D Pickering**

Date: **10-31-17**

Page: **1** of **2**

No. of Coolers: **1**

Cooler Temps: **2**

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



| Sample ID               | Date     | Time | Matrix | No. Containers | Analysis Requested                          |   |  |   |  |  |                                      |                            | Notes/Comments |  |  |  |  |  |
|-------------------------|----------|------|--------|----------------|---|---|--|---|--|--|--------------------------------------|----------------------------|----------------|--|--|--|--|--|
|                         |          |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide, Nitrate,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |                |  |  |  |  |  |
| GW-125+50-1-103117      | 10-31-17 | 1000 | water  | 3              |   | X   |  | X   | X  | X  | X                                    |                            |                |  |  |  |  |  |
| GW-125+50-1-103117-(20) |          | 1000 |        | 3              |   | X   |  |   | X  |  |                                      | X                          |                |  |  |  |  |  |
| GW-126+90-0-103117      |          | 945  |        |                |   |   |  |   | X  |  |                                      |                            |                |  |  |  |  |  |
| GW-126+90-0-103117-(20) |          | 945  |        |                |   |   |  |   | X  |  |                                      |                            |                |  |  |  |  |  |
| GW-125+50-0-103117      |          | 1020 |        |                |   |   |  | X   |  |  |                                      |                            |                |  |  |  |  |  |
| GW-125+50-0-103117-(20) |          | 1020 |        |                |   |   |  | X   |  |  |                                      |                            |                |  |  |  |  |  |
| GW-124+00-1-103117      |          | 1100 |        |                |   |   |  | X   |  |  |                                      |                            |                |  |  |  |  |  |
| GW-124+00-1-103117-(20) |          | 1100 |        |                |   |   |  | X   |  |  |                                      |                            |                |  |  |  |  |  |
| GW-124+00-0-103117      |          | 1055 |        |                |   |   |  | X   |  |  |                                      |                            |                |  |  |  |  |  |
| GW-124+00-0-103117-(20) |          | 1055 |        |                |   |   |  | X   |  |  |                                      |                            |                |  |  |  |  |  |
| GW-126+90-3-103117      |          | 1215 |        |                |   |   |  | X   |  |  |                                      |                            |                |  |  |  |  |  |

|  |                                 |                                 |
|--|---------------------------------|---------------------------------|
| Comments/Special Instructions<br><br>Submit EDD to PIONEER<br>using PIONEER EDD format<br>Bill to Port of Tacoma<br>PO#79227 | Relinquished by:<br>(Signature) | Received by:<br>(Signature)     |
|  | Printed Name:<br>Lube horn      | Printed Name:<br>Sachoswale     |
|  | Company:<br>POF                 | Company:<br>ARI                 |
|  | Date & Time:<br>10-31-17 1505   | Date & Time:<br>10/31/2017 1505 |

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WORK ORDER

17J0578

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID    | Container Type                        | pH      |
|-----------------|---------------------------------------|---------|
| 17J0578-01 A    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-01 B    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-01 C    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-02 A    | Large OJ, 1000 mL FF                  |         |
| 17J0578-02 B    | Small OJ, 500 mL FF                   |         |
| 17J0578-02 C    | Glass NM, Amber, 250 mL, 9N H2SO4 FF  | C2 pass |
| 17J0578-03 A    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-03 B    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-03 C    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-04 A    | Large OJ, 1000 mL FF                  |         |
| 17J0578-04 B    | Small OJ, 500 mL FF                   |         |
| 17J0578-04 C    | Glass NM, Amber, 250 mL, 9N H2SO4 FF  | C2 pass |
| 17J0578-05 A sm | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-05 B    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-05 C    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-06 A    | Large OJ, 1000 mL FF                  |         |
| 17J0578-06 B    | Small OJ, 500 mL FF                   |         |
| 17J0578-06 C    | Glass NM, Amber, 250 mL, 9N H2SO4 FFF | C2 pass |
| 17J0578-07 A    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-07 B    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-07 C    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-08 A    | Large OJ, 1000 mL FF                  |         |
| 17J0578-08 B    | Small OJ, 500 mL FF                   |         |
| 17J0578-08 C    | Glass NM, Amber, 250 mL, 9N H2SO4 FF  | C2 pass |
| 17J0578-09 A    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-09 B    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-09 C    | VOA Vial, Clear, 40 mL, HCL           |         |
| 17J0578-10 A    | Large OJ, 1000 mL FF                  |         |
| 17J0578-10 B    | Small OJ, 500 mL FF                   |         |
| 17J0578-10 C    | Glass NM, Amber, 250 mL, 9N H2SO4 FF  | C2 pass |
| 17J0578-11 A sm | VOA Vial, Clear, 40 mL, HCL           |         |



WORK ORDER

17J0578

|   |   |   |         |
|---|---|---|---------|
| <b>Client: Pioneer Technologies Corporation</b>                 |   | <b>Project Manager: Amanda Volgardsen</b>                         |         |
| <b>Project: Port of Tacoma Arkema- FS Data Gap Investigatio</b> |   | <b>Project Number: Port of Tacoma Arkema- FS Data Gap Investi</b> |         |
| 17J0578-11 B  | Sm VOA Vial, Clear, 40 mL, HCL            |   |         |
| 17J0578-11 C  | Sm VOA Vial, Clear, 40 mL, HCL            |   |         |
| 17J0578-12 A  | Large OJ, 1000 mL                         | FF  |         |
| 17J0578-12 B  | Small OJ, 500 mL                          | FF  |         |
| 17J0578-12 C  | Glass NM, Amber, 250 mL, 9N H2SO4         | FF  | <2 pass |
| 17J0578-13 A  | Sm VOA Vial, Clear, 40 mL, HCL            |   |         |
| 17J0578-13 B  | Sm VOA Vial, Clear, 40 mL, HCL            |   |         |
| 17J0578-13 C  | Sm VOA Vial, Clear, 40 mL, HCL            |   |         |
| 17J0578-14 A  | Large OJ, 1000 mL                         | FF  |         |
| 17J0578-14 B  | Small OJ, 500 mL                          | FF  |         |
| 17J0578-14 C  | Glass NM, Amber, 250 mL, 9N H2SO4         | FF  | <2 pass |
| 17J0578-15 A  | pb VOA Vial, Clear, 40 mL, HCL            |   |         |
| 17J0578-15 B  | Small bubbles VOA Vial, Clear, 40 mL, HCL |   |         |
| 17J0578-15 C  | Small bubbles VOA Vial, Clear, 40 mL, HCL |   |         |
| 17J0578-16 A  | Large OJ, 1000 mL                         | FF  |         |
| 17J0578-16 B  | Small OJ, 500 mL                          | FF  |         |
| 17J0578-16 C  | Glass NM, Amber, 250 mL, 9N H2SO4         | FF  | <2 pass |
| 17J0578-17 A  | Ig VOA Vial, Clear, 40 mL, HCL            |   |         |
| 17J0578-18 A  | Glass NM, Amber, 250 mL, 9N H2SO4         | FF  | <2 pass |
| 17J0578-19 A  | Glass NM, Amber, 250 mL, 9N H2SO4         | FF  | <2 pass |

SF  
Preservation Confirmed By \_\_\_\_\_

10/31/17  
Date \_\_\_\_\_





# Cooler Receipt Form

ARI Client: Pioneer Technologies

Project Name: Arkema FSDG Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: \_\_\_\_\_

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of cooler? YES  NO

Were custody papers included with the cooler? YES  NO

Were custody papers properly filled out (ink, signed, etc.) SF YES  NO  2

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) Time: 1505 13.9°C

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005706

Cooler Accepted by: SBL Date: 10/31/2017 Time: 1505

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? YES  NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? NA YES  NO

Were all bottles sealed in individual plastic bags? YES  NO

Did all bottles arrive in good condition (unbroken)? YES  NO

Were all bottle labels complete and legible? YES  NO

Did the number of containers listed on COC match with the number of containers received? YES  NO  1

Did all bottle labels and tags agree with custody papers? YES  NO

Were all bottles used correct for the requested analyses? YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO

Were all VOC vials free of air bubbles? NA YES  NO

Was sufficient amount of sample sent in each bottle? YES  NO

Date VOC Trip Blank was made at ARI: SF NA 10/23/17

Was Sample Split by ARI: NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: SF Date: 10/31/17 Time: 1540

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

① 18A & 19A 2 extra sample bottles —  
② COC marked for diss metals analysis, not needed.  
By: SF Date: 10/31/17  
air bubbles on preservation sheet

|                                    |                              |  |  |
|------------------------------------|------------------------------|--|--|
| <p>Small Air Bubbles<br/>← 2mm</p> | <p>Peabubbles<br/>2-4 mm</p> | <p>LARGE Air Bubbles<br/>&gt; 4 mm</p> | <p>Small → "sm" (&lt; 2 mm)</p> <p>Peabubbles → "pb" (2 to &lt; 4 mm)</p> <p>Large → "lg" (4 to &lt; 6 mm)</p> <p>Headspace → "hs" (&gt; 6 mm)</p> |
|------------------------------------|------------------------------|--|--|



# Cooler Temperature Compliance Form

| Cooler#:                   | Temperature(°C): |             |
|----------------------------|------------------|-------------|
| Sample ID                  | Bottle Count     | Bottle Type |
| Samples recieved above 6°C |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
| Cooler#:                   | Temperature(°C): |             |
| Sample ID                  | Bottle Count     | Bottle Type |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
| Cooler#:                   | Temperature(°C): |             |
| Sample ID                  | Bottle Count     | Bottle Type |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
| Cooler#:                   | Temperature(°C): |             |
| Sample ID                  | Bottle Count     | Bottle Type |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |
|                            |                  |             |

Completed by: SBW

Date: 10/31/2017

Time: 1505





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID               | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-------------------------|---------------|--------|-------------------|-------------------|
| GW-125+50-1-103117      | 17J0578-01    | Water  | 31-Oct-2017 10:00 | 31-Oct-2017 15:05 |
| GW-125+50-1-103117-(20) | 17J0578-02    | Water  | 31-Oct-2017 10:00 | 31-Oct-2017 15:05 |
| GW-126+90-0-103117      | 17J0578-03    | Water  | 31-Oct-2017 09:45 | 31-Oct-2017 15:05 |
| GW-126+90-0-103117-(20) | 17J0578-04    | Water  | 31-Oct-2017 09:45 | 31-Oct-2017 15:05 |
| GW-125+50-0-103117      | 17J0578-05    | Water  | 31-Oct-2017 10:20 | 31-Oct-2017 15:05 |
| GW-125+50-0-103117-(20) | 17J0578-06    | Water  | 31-Oct-2017 10:20 | 31-Oct-2017 15:05 |
| GW-124+00-1-103117      | 17J0578-07    | Water  | 31-Oct-2017 11:00 | 31-Oct-2017 15:05 |
| GW-124+00-1-103117-(20) | 17J0578-08    | Water  | 31-Oct-2017 11:00 | 31-Oct-2017 15:05 |
| GW-124+00-0-103117      | 17J0578-09    | Water  | 31-Oct-2017 10:55 | 31-Oct-2017 15:05 |
| GW-124+00-0-103117-(20) | 17J0578-10    | Water  | 31-Oct-2017 10:55 | 31-Oct-2017 15:05 |
| GW-126+90-3-103117      | 17J0578-11    | Water  | 31-Oct-2017 12:15 | 31-Oct-2017 15:05 |
| GW-126+90-3-103117-(20) | 17J0578-12    | Water  | 31-Oct-2017 12:15 | 31-Oct-2017 15:05 |
| GW-126+90-3-103117-(01) | 17J0578-13    | Water  | 31-Oct-2017 12:20 | 31-Oct-2017 15:05 |
| GW-126+90-3-103117-(21) | 17J0578-14    | Water  | 31-Oct-2017 12:20 | 31-Oct-2017 15:05 |
| GW-120+75-2-103117      | 17J0578-15    | Water  | 31-Oct-2017 13:00 | 31-Oct-2017 15:05 |
| GW-120+75-2-103117-(20) | 17J0578-16    | Water  | 31-Oct-2017 13:00 | 31-Oct-2017 15:05 |
| Trip Blank              | 17J0578-17    | Water  | 30-Oct-2017 00:00 | 31-Oct-2017 15:05 |
| GW-129+65-1-103017-(20) | 17J0578-18    | Water  | 30-Oct-2017 09:30 | 31-Oct-2017 15:05 |
| GW-128+30-1-103017-(20) | 17J0578-19    | Water  | 31-Oct-2017 10:45 | 31-Oct-2017 15:05 |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 12:59

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 31, 2017 under ARI workorder 17J0578. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The initial calibration verification (ICV) is outside of control limits high for Vinyl Chloride. Associated samples and QC have been flagged with a "Q" qualifier. No further corrective action was taken.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Anions - EPA Method 300.0

The reanalysis of O-phos was analyzed outside of the recommended holding time. The O-Phos has been flagged with an "H" qualifier.

Some samples have building Phosphate peaks, and all analysis were reported. This is likely due to matrix interference and high metals concentrations in the samples, and could have affected any associated QC.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-126+90-0-103117. The duplicate has a Nitrite concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. The Nitrite has been flagged with an "L" qualifier on the duplicate. The matrix spike has low spike recovery for Nitrate, Nitrite and O-Phos. This is likely due to matrix interference as well as high metals concentrations in the samples. The results are advisory. No corrective action was taken.

### Alkalinity - Method SM2320



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29-Nov-2017 12:59

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

#### **Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.



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Reported:  
29-Nov-2017 12:59

**GW-125+50-1-103117**  
**17J0578-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 10:00  
Analyzed: 03-Nov-2017 18:02

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 124   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 93.5  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 86.0  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 107   | %     |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-1-103117-(20)**  
**17J0578-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 10:00  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>17500</b> | mg/L  |       |



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Reported:  
29-Nov-2017 12:59

**GW-125+50-1-103117-(20)**  
**17J0578-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/31/2017 10:00  
Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062 Sample Size: 100 mL  
Prepared: 02-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 100    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 100    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-1-103117-(20)**  
**17J0578-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 10:00  
Analyzed: 17-Nov-2017 02:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.85</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

**GW-125+50-1-103117-(20)**  
**17J0578-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:00  
Analyzed: 04-Nov-2017 02:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.706</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | <b>0.176</b> | mg-N/L |       |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-1-103117-(20)**  
**17J0578-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:00  
Analyzed: 09-Nov-2017 20:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>36.8</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**GW-125+50-1-103117-(20)**  
**17J0578-02RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:00  
Analyzed: 10-Nov-2017 02:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>10400</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**GW-125+50-1-103117-(20)**  
**17J0578-02RE5 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:00  
Analyzed: 11-Nov-2017 14:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1500</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 12:59

**GW-126+90-0-103117**  
**17J0578-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 09:45  
Analyzed: 03-Nov-2017 18:22

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 122 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 93.3 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 85.0 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 104 %  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**GW-126+90-0-103117-(20)**  
**17J0578-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 09:45  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>15100</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**GW-126+90-0-103117-(20)**  
**17J0578-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:45  
Analyzed: 31-Oct-2017 20:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result       | Units  | Notes |
|-----------|------------|----------|-----------------|--------------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | <b>0.369</b> | mg-N/L |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 12:59

**GW-126+90-0-103117-(20)**  
**17J0578-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/31/2017 09:45  
Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062 Sample Size: 100 mL  
Prepared: 02-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-0-103117-(20)**  
**17J0578-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 09:45  
Analyzed: 17-Nov-2017 03:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.32</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-0-103117-(20)**  
**17J0578-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:45  
Analyzed: 04-Nov-2017 03:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.534</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |





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Project Number: 79227  
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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-0-103117-(20)**  
**17J0578-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:45  
Analyzed: 09-Nov-2017 21:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>33.0</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-0-103117-(20)**  
**17J0578-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:45  
Analyzed: 10-Nov-2017 00:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>1370</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-0-103117-(20)**  
**17J0578-04RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:45  
Analyzed: 10-Nov-2017 03:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>9410</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

**GW-125+50-0-103117**  
**17J0578-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 10:20  
Analyzed: 03-Nov-2017 18:43

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 128   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 93.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 84.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 112   | %     |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-0-103117-(20)**  
**17J0578-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 10:20  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>19500</b> | mg/L  |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-0-103117-(20)**  
**17J0578-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:20  
Analyzed: 31-Oct-2017 20:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Reported:  
29-Nov-2017 12:59

**GW-125+50-0-103117-(20)**  
**17J0578-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/31/2017 10:20

Instrument: Accumet AR60

Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>100</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>100</b> | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-0-103117-(20)**  
**17J0578-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 10:20  
Analyzed: 17-Nov-2017 03:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.83</b> | mg/L  | D     |





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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-0-103117-(20)**  
**17J0578-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:20  
Analyzed: 04-Nov-2017 04:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.687</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-0-103117-(20)**  
**17J0578-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:20  
Analyzed: 09-Nov-2017 21:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>43.1</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-0-103117-(20)**  
**17J0578-06RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:20  
Analyzed: 10-Nov-2017 03:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>11900</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-125+50-0-103117-(20)**  
**17J0578-06RE5 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:20  
Analyzed: 11-Nov-2017 15:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1730</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

**GW-124+00-1-103117**  
**17J0578-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 11:00  
Analyzed: 03-Nov-2017 19:03

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.16</b> | ug/L  | J     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 126   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 94.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 84.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 109   | %     |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-1-103117-(20)**  
**17J0578-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 11:00  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>22100</b> | mg/L  |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-1-103117-(20)**  
**17J0578-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 11:00  
Analyzed: 31-Oct-2017 21:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |



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Reported:  
29-Nov-2017 12:59

**GW-124+00-1-103117-(20)**  
**17J0578-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/31/2017 11:00  
Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 328    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 328    | mg/L CaCO3 |       |





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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-1-103117-(20)**  
**17J0578-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 11:00  
Analyzed: 17-Nov-2017 03:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>9.45</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**GW-124+00-1-103117-(20)**  
**17J0578-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 11:00  
Analyzed: 04-Nov-2017 04:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>1.29</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-1-103117-(20)**  
**17J0578-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 11:00  
Analyzed: 09-Nov-2017 22:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>43.8</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-1-103117-(20)**  
**17J0578-08RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 11:00  
Analyzed: 10-Nov-2017 01:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1840</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**GW-124+00-1-103117-(20)**  
**17J0578-08RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 11:00  
Analyzed: 10-Nov-2017 04:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>13400</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

**GW-124+00-0-103117**  
**17J0578-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 10:55  
Analyzed: 03-Nov-2017 19:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 128   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.3  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 85.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 111   | %     |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-0-103117-(20)**  
**17J0578-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 10:55  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>23000</b> | mg/L  |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-0-103117-(20)**  
**17J0578-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:55  
Analyzed: 31-Oct-2017 21:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |





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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-0-103117-(20)**  
**17J0578-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/31/2017 10:55

Instrument: Accumet AR60

Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>109</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>109</b> | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-0-103117-(20)**  
**17J0578-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 10:55  
Analyzed: 17-Nov-2017 04:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.67</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-0-103117-(20)**  
**17J0578-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:55  
Analyzed: 04-Nov-2017 05:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.571</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-0-103117-(20)**  
**17J0578-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:55  
Analyzed: 09-Nov-2017 22:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>48.0</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-0-103117-(20)**  
**17J0578-10RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:55  
Analyzed: 10-Nov-2017 04:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>14000</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-124+00-0-103117-(20)**  
**17J0578-10RE5 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:55  
Analyzed: 11-Nov-2017 15:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2070</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

**GW-126+90-3-103117**  
**17J0578-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 12:15  
Analyzed: 03-Nov-2017 19:44

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 123   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 93.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 82.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 109   | %     |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(20)**  
**17J0578-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 12:15  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 75 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>887</b> | mg/L  |       |





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Reported:  
29-Nov-2017 12:59

**GW-126+90-3-103117-(20)**  
**17J0578-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 12:15  
Analyzed: 31-Oct-2017 21:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | 1.48   | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(20)**  
**17J0578-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/31/2017 12:15  
Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>298</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>298</b> | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(20)**  
**17J0578-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 12:15  
Analyzed: 17-Nov-2017 04:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.56</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(20)**  
**17J0578-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 12:15  
Analyzed: 04-Nov-2017 05:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(20)**  
**17J0578-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 12:15  
Analyzed: 10-Nov-2017 05:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>357</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

**GW-126+90-3-103117-(01)**  
**17J0578-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 12:20  
Analyzed: 03-Nov-2017 20:04

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0092 Sample Size: 10 mL  
Prepared: 03-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 122   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 84.5  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(21)**  
**17J0578-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 12:20  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 75 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>887</b> | mg/L  |       |



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Reported:  
29-Nov-2017 12:59

**GW-126+90-3-103117-(21)**  
**17J0578-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 12:20  
Analyzed: 31-Oct-2017 22:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | 1.38   | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |





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Reported:  
29-Nov-2017 12:59

**GW-126+90-3-103117-(21)**  
**17J0578-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/31/2017 12:20  
Analyzed: 02-Nov-2017 16:30

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 297    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 297    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(21)**  
**17J0578-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 12:20  
Analyzed: 17-Nov-2017 05:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.62</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(21)**  
**17J0578-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 12:20  
Analyzed: 04-Nov-2017 05:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |



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**Reported:**  
29-Nov-2017 12:59

**GW-126+90-3-103117-(21)**  
**17J0578-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 12:20  
Analyzed: 10-Nov-2017 05:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>356</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

**GW-120+75-2-103117**  
**17J0578-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/31/2017 13:00  
Analyzed: 06-Nov-2017 15:27

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0136 Sample Size: 1 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 101   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 88.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 98.7  | %     |



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**Reported:**  
29-Nov-2017 12:59

**GW-120+75-2-103117-(20)**  
**17J0578-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 13:00  
Analyzed: 03-Nov-2017 09:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0080 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>23800</b> | mg/L  |       |



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**Reported:**  
29-Nov-2017 12:59

**GW-120+75-2-103117-(20)**  
**17J0578-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 13:00  
Analyzed: 31-Oct-2017 23:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |



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Reported:  
29-Nov-2017 12:59

**GW-120+75-2-103117-(20)**  
**17J0578-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 10/31/2017 13:00

Instrument: Accumet AR60

Analyzed: 02-Nov-2017 14:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0062  
Prepared: 02-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1720   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1720   | mg/L CaCO3 |       |





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**Reported:**  
29-Nov-2017 12:59

**GW-120+75-2-103117-(20)**  
**17J0578-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 13:00  
Analyzed: 17-Nov-2017 05:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>34.6</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-120+75-2-103117-(20)**  
**17J0578-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 13:00  
Analyzed: 04-Nov-2017 06:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895  
Prepared: 31-Oct-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>1.07</b> | mg/L  | D     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>3.12</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>1.18</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-120+75-2-103117-(20)**  
**17J0578-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 13:00  
Analyzed: 09-Nov-2017 22:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | 13.7   | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-120+75-2-103117-(20)**  
**17J0578-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 13:00  
Analyzed: 12-Nov-2017 08:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0895 Sample Size: 5 mL  
Prepared: 31-Oct-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>16000</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

**Trip Blank**  
**17J0578-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/30/2017 00:00  
Analyzed: 06-Nov-2017 11:36

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0136 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|--|------------|----------|-----------------|-----------------|-------------|----------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L     | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L     | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L     | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L     | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 | <i>80-129 %</i> | <i>101</i>  | <i>%</i> |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 | <i>80-120 %</i> | <i>95.8</i> | <i>%</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 | <i>80-120 %</i> | <i>89.0</i> | <i>%</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 | <i>80-120 %</i> | <i>99.4</i> | <i>%</i> |       |



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**GW-129+65-1-103017-(20)**  
**17J0578-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/30/2017 09:30  
Analyzed: 17-Nov-2017 06:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.96</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 12:59

**GW-128+30-1-103017-(20)**  
**17J0578-19 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 10/31/2017 10:45  
Analyzed: 17-Nov-2017 06:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0431 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.33</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 12:59

### Volatile Organic Compounds - Quality Control

#### Batch BFK0092 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0092-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 12:29 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 5.12   |                 |                 | ug/L  | 5.00        |   | 102  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.62   |                 |                 | ug/L  | 5.00        |   | 92.5 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.34   |                 |                 | ug/L  | 5.00        |   | 86.9 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.32   |                 |                 | ug/L  | 5.00        |   | 106  | 80-120      |      |           |       |
| <b>LCS (BFK0092-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 10:39 |      |             |      |           |       |
| Vinyl Chloride                    | 10.0   | 0.06            | 0.20            | ug/L  | 10.0        |   | 100  | 66-133      |      |           |       |
| Chloroform                        | 9.76   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.6 | 80-122      |      |           |       |
| Trichloroethene                   | 9.57   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.7 | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.82   |                 |                 | ug/L  | 5.00        |   | 96.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.62   |                 |                 | ug/L  | 5.00        |   | 92.3 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.6 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.83   |                 |                 | ug/L  | 5.00        |   | 96.5 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.79   |                 |                 | ug/L  | 5.00        |   | 95.8 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0092-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 12:09 |      |             |      |           |       |
| Vinyl Chloride                    | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      | 1.01 | 30        |       |
| Chloroform                        | 9.64   | 0.03            | 0.20            | ug/L  | 10.0        |   | 96.4 | 80-122      | 1.15 | 30        |       |
| Trichloroethene                   | 9.66   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.6 | 80-120      | 0.96 | 30        |       |
| Tetrachloroethene                 | 9.77   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.7 | 80-120      | 2.98 | 30        |       |
| Surrogate: Dibromofluoromethane   | 4.82   |                 |                 | ug/L  | 5.00        |   | 96.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.41   |                 |                 | ug/L  | 5.00        |   | 88.2 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.88   |                 |                 | ug/L  | 5.00        |   | 97.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.02   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 12:59

**Volatile Organic Compounds - Quality Control**

**Batch BFK0136 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0136-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 10:45 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.6 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.85   |                 |                 | ug/L  | 5.00        |   | 97.1 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.49   |                 |                 | ug/L  | 5.00        |   | 89.8 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.09   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFK0136-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 08:38 |      |             |      |           |       |
| Vinyl Chloride                    | 12.4   | 0.06            | 0.20            | ug/L  | 10.0        |   | 124  | 66-133      |      |           | Q     |
| Chloroform                        | 9.21   | 0.03            | 0.20            | ug/L  | 10.0        |   | 92.1 | 80-122      |      |           |       |
| Trichloroethene                   | 9.65   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.5 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.53   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.3 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.67   |                 |                 | ug/L  | 5.00        |   | 93.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.82   |                 |                 | ug/L  | 5.00        |   | 96.5 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.83   |                 |                 | ug/L  | 5.00        |   | 96.6 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.52   |                 |                 | ug/L  | 5.00        |   | 90.5 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.93   |                 |                 | ug/L  | 5.00        |   | 98.6 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0136-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 09:04 |      |             |      |           |       |
| Vinyl Chloride                    | 12.6   | 0.06            | 0.20            | ug/L  | 10.0        |   | 126  | 66-133      | 1.84 | 30        | Q     |
| Chloroform                        | 9.31   | 0.03            | 0.20            | ug/L  | 10.0        |   | 93.1 | 80-122      | 1.12 | 30        |       |
| Trichloroethene                   | 9.19   | 0.05            | 0.20            | ug/L  | 10.0        |   | 91.9 | 80-120      | 4.88 | 30        |       |
| Tetrachloroethene                 | 9.53   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.3 | 80-120      | 0.01 | 30        |       |
| Surrogate: Dibromofluoromethane   | 4.61   |                 |                 | ug/L  | 5.00        |   | 92.1 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.91   |                 |                 | ug/L  | 5.00        |   | 98.3 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.89   |                 |                 | ug/L  | 5.00        |   | 97.8 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.62   |                 |                 | ug/L  | 5.00        |   | 92.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.96   |                 |                 | ug/L  | 5.00        |   | 99.1 | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 12:59

Wet Chemistry - Quality Control

Batch BFJ0895 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units  | Spike Level                                       | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---------------------------------|--------|---|--------|---|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0895-BLK1)</b>     |        | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 17:16 |        |   |               |      |             |       |           |       |
| Bromide                         | ND     | 0.100   | mg/L   |   |               |      |             |       |           | U     |
| Chloride                        | ND     | 0.100   | mg/L   |   |               |      |             |       |           | U     |
| Fluoride                        | ND     | 0.100   | mg/L   |   |               |      |             |       |           | U     |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |       |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |       |           | U     |
| Orthophosphorus                 | ND     | 0.10  | mg-P/L |   |               |      |             |       |           | U     |
| Sulfate                         | ND     | 0.100   | mg/L   |   |               |      |             |       |           | U     |
| <b>LCS (BFJ0895-BS1)</b>        |        | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 17:35 |        |   |               |      |             |       |           |       |
| Bromide                         | 1.51   | 0.100   | mg/L   | 1.50  |               | 100  | 90-110      |       |           |       |
| Chloride                        | 1.52   | 0.100   | mg/L   | 1.50  |               | 102  | 90-110      |       |           |       |
| Fluoride                        | 1.56   | 0.100   | mg/L   | 1.50  |               | 104  | 90-110      |       |           |       |
| Nitrate-N                       | 1.54   | 0.100   | mg-N/L | 1.50  |               | 103  | 90-110      |       |           |       |
| Nitrite-N                       | 1.53   | 0.100   | mg-N/L | 1.50  |               | 102  | 90-110      |       |           |       |
| Orthophosphorus                 | 1.54   | 0.10  | mg-P/L | 1.50  |               | 103  | 90-110      |       |           |       |
| Sulfate                         | 1.57   | 0.100   | mg/L   | 1.50  |               | 104  | 90-110      |       |           |       |
| <b>Duplicate (BFJ0895-DUP2)</b> |        | Source: 17J0578-02                                |        | Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 19:55 |               |      |             |       |           |       |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |   | ND            |      |             |       |           | U     |
| Nitrite-N                       | 0.326  | 0.100   | mg-N/L |   | 0.176         |      |             | 59.80 | 20        | *, L  |
| <b>Duplicate (BFJ0895-DUP3)</b> |        | Source: 17J0578-02RE1                             |        | Prepared: 31-Oct-2017 Analyzed: 04-Nov-2017 02:44 |               |      |             |       |           |       |
| Fluoride                        | 0.704  | 0.500   | mg/L   |   | 0.706         |      |             | 0.28  | 20        | D     |
| Orthophosphorus                 | ND     | 0.50  | mg-P/L |   | ND            |      |             |       |           | U     |
| <b>Duplicate (BFJ0895-DUP4)</b> |        | Source: 17J0578-02RE2                             |        | Prepared: 31-Oct-2017 Analyzed: 09-Nov-2017 20:42 |               |      |             |       |           |       |
| Bromide                         | 37.0   | 2.00  | mg/L   |   | 36.8          |      |             | 0.47  | 20        | D     |
| <b>Duplicate (BFJ0895-DUP5)</b> |        | Source: 17J0578-02RE4                             |        | Prepared: 31-Oct-2017 Analyzed: 10-Nov-2017 02:27 |               |      |             |       |           |       |
| Chloride                        | 10400  | 1000  | mg/L   |   | 10400         |      |             | 0.48  | 20        | D     |
| <b>Duplicate (BFJ0895-DUP6)</b> |        | Source: 17J0578-02RE4                             |        | Prepared: 31-Oct-2017 Analyzed: 10-Nov-2017 02:46 |               |      |             |       |           |       |
| Chloride                        | 10400  | 1000  | mg/L   |   | 10400         |      |             | 0.16  | 20        | D     |
| <b>Duplicate (BFJ0895-DUP8)</b> |        | Source: 17J0578-02RE5                             |        | Prepared: 31-Oct-2017 Analyzed: 11-Nov-2017 14:45 |               |      |             |       |           |       |
| Fluoride                        | ND     | 100   | mg/L   |   | ND            |      |             |       |           | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 12:59

Wet Chemistry - Quality Control

Batch BFJ0895 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes   |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|---------|
| <b>Duplicate (BFJ0895-DUP8)</b> Source: 17J0578-02RE5 Prepared: 31-Oct-2017 Analyzed: 11-Nov-2017 14:45   |        |                 |        |             |               |      |             |      |           |         |
| Sulfate   | 1490   | 100             | mg/L   |             | 1500          |      |             | 0.34 | 20        | D       |
| <b>Duplicate (BFJ0895-DUP9)</b> Source: 17J0578-02RE5 Prepared: 31-Oct-2017 Analyzed: 11-Nov-2017 15:05   |        |                 |        |             |               |      |             |      |           |         |
| Fluoride  | ND     | 100             | mg/L   |             | ND            |      |             |      |           | U       |
| Sulfate   | 1490   | 100             | mg/L   |             | 1500          |      |             | 0.87 | 20        | D       |
| <b>Matrix Spike (BFJ0895-MS2)</b> Source: 17J0578-02 Prepared: 31-Oct-2017 Analyzed: 31-Oct-2017 20:15    |        |                 |        |             |               |      |             |      |           |         |
| Nitrate-N   | 1.33   | 0.100           | mg-N/L | 2.00        | ND            | 66.6 | 75-125      |      |           | *       |
| Nitrite-N   | 0.881  | 0.100           | mg-N/L | 2.00        | 0.176         | 35.3 | 75-125      |      |           | *       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |         |
| <b>Matrix Spike (BFJ0895-MS3)</b> Source: 17J0578-02RE1 Prepared: 31-Oct-2017 Analyzed: 04-Nov-2017 03:04 |        |                 |        |             |               |      |             |      |           |         |
| Fluoride  | 2.61   | 0.500           | mg/L   | 2.00        | 0.706         | 95.1 | 75-125      |      |           | D       |
| Orthophosphorus   | 1.39   | 0.50            | mg-P/L | 2.00        | ND            | 69.4 | 75-125      |      |           | *, H, D |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |         |
| <b>Matrix Spike (BFJ0895-MS5)</b> Source: 17J0578-02RE2 Prepared: 31-Oct-2017 Analyzed: 09-Nov-2017 21:02 |        |                 |        |             |               |      |             |      |           |         |
| Bromide   | 52.6   | 5.00            | mg/L   | 20.0        | 36.8          | 79.0 | 75-125      |      |           | D       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |         |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**Wet Chemistry - Quality Control**

**Batch BFK0062 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD | RPD Limit | Notes |
|---------------------------------|--------|---|------------|-------------|---------------|------|--------------|-----|-----------|-------|
| <b>Blank (BFK0062-BLK1)</b>     |        | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:10 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| <b>Blank (BFK0062-BLK2)</b>     |        | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 16:30 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| <b>Reference (BFK0062-SRM1)</b> |        | Prepared: 02-Nov-2017 Analyzed: 02-Nov-2017 14:10 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | 107    | 1.00  | mg/L CaCO3 | 108         |               | 98.8 | 90.37-108.33 |     |           |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**Wet Chemistry - Quality Control**

**Batch BFK0080 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0080-BLK1)</b> |        |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:22 |      |             |     |           |       |
| Dissolved Solids            | ND     | 5.0             | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0080-BS1)</b>    |        |                 |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:22 |      |             |     |           |       |
| Dissolved Solids            | 502    | 5.0             | mg/L  | 500         |   | 100  | 90-110      |     |           |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 12:59

**Wet Chemistry - Quality Control**

**Batch BFK0431 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0431-BLK1)</b>         |        |                 |       |             | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 20:01 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 1.00            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0431-BS1)</b>            |        |                 |       |             | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 20:24 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 19.5   | 1.00            | mg/L  | 20.0        |   | 97.6 | 90-110      |     |           | D     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
29-Nov-2017 12:59

### Certified Analyses included in this Report

| Analyte                               | Certifications                  |
|---------------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>             |                                 |
| Bromide                               | DoD-ELAP,WADOE,NELAP            |
| Chloride                              | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                              | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                             | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                             | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                       | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                               | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 8260C in Water</b>             |                                 |
| Chloromethane                         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

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Reported:  
29-Nov-2017 12:59

|                             |                                 |
|-----------------------------|---------------------------------|
| Trichloroethene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone        | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene           | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 12:59

|                          |                                 |
|--------------------------|---------------------------------|
| 1,2,4-Trichlorobenzene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                 | WADOE                           |
| 2-Pentanone              | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |

**SM 5310 B-00 in Water**

|                          |                   |
|--------------------------|-------------------|
| Dissolved Organic Carbon | WADOE,WA-DW,NELAP |
|--------------------------|-------------------|

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 12:59

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- H Hold time violation - Hold time was exceeded.
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



10 January 2018

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17K0014

Associated SDG ID(s)  
N/A

-----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17K0014** Turn-around Requested: **Normal** Date: **11-1-2017**

ARI Client Company: **Pioneer Technologies** Phone: **360-570-1700** Page: **1** of **3**

Client Contact: **Troy Bussey (busseyt@uspioneer.com)** Client Project Name: **Arkema FS DG Inv** No. of Coolers: **1** Cooler Temps: **3**

Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kerner / D Pickering**

Client Project #: **79227**



Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

| Sample ID   | Date  | Time  | Matrix | No. Containers | Analysis Requested                          |  |  |   |  |  |                                      | Notes/Comments |                            |
|---|---|---|--------|----------------|---|--|--|---|--|--|--------------------------------------|----------------|----------------------------|
|   |   |   |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide, Nitrate,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 |                | Dissolved DOC<br>SM 5310 B |
| GW-129+65-1-103117  | 10-31-17  | 930   | Water  | 3              | X   | X  | X  | X   | X  | X  | X                                    |                |                            |
| GW-129+65-1-103117-(20)   |   | 930   |        | 3              | X   | X  | X  | X   | X  | X  | X                                    |                | DOC already submitted      |
| GW-128+30-1-103117  |   | 1045  |        | 3              | X   | X  | X  | X   | X  | X  | X                                    |                |                            |
| GW-128+30-1-103117-(20)   |   | 1045  |        | 3              | X   | X  | X  | X   | X  | X  | X                                    |                | DOC already submitted      |
| GW-561-3-110117   | 11-01-17  | 920   |        | 4              | X   | X  | X  | X   | X  | X  | X                                    |                |                            |
| GW-561-3-110117-(20)  |   | 920   |        | 4              | X   | X  | X  | X   | X  | X  | X                                    |                |                            |
| GW-662-3-110117   |   | 915   |        | 4              | X   | X  | X  | X   | X  | X  | X                                    |                | MS/MSD                     |
| GW-662-3-110117-(20)  |   | 915   |        | 4              | X   | X  | X  | X   | X  | X  | X                                    |                | MS/MSD                     |
| GW-541-1-110117   |   | 1055  |        | 4              | X   | X  | X  | X   | X  | X  | X                                    |                | MS/MSD                     |
| GW-541-1-110117-(20)  |   | 1055  |        | 4              | X   | X  | X  | X   | X  | X  | X                                    |                | MS/MSD                     |
| GW-461-1-110117   |   | 1050  |        | 4              | X   | X  | X  | X   | X  | X  | X                                    |                | MS/MSD                     |
| Comments/Special Instructions   |   |   |        |                |   |  |  |   |  |  |                                      |                |                            |
| Relinquished by: <b>Luke Berne</b><br>(Signature)<br>Printed Name: <b>Luke Berne</b><br>Company: <b>ARI</b><br>Date & Time: <b>11-1-17 1625</b> | Relinquished by: <b>Stephanie Fiswal</b><br>(Signature)<br>Printed Name: <b>Stephanie Fiswal</b><br>Company: <b>ARI</b><br>Date & Time: <b>11/1/17 1625</b> | Received by: <b>[Signature]</b><br>(Signature)<br>Printed Name:<br>Company:<br>Date & Time: |        |                |   |  |  |   |  |  |                                      |                |                            |

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSD/PA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17K0014**  
 Turn-around Requested: **Normal**  
 ARI Client Company: **Pioneer Technologies**  
 Phone: **360-570-1700**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kerner / D Pickering**

Date: **11-01-2017**  
 Page: **2** of **3**  
 No. of Coolers: \_\_\_\_\_  
 Cooler Temps: \_\_\_\_\_

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID  | Date     | Time | Matrix | No. Containers | Analysis Requested                          |  |  |   |  |  |                                      |                            | Notes/Comments |   |
|--|----------|------|--------|----------------|---|--|--|---|--|--|--------------------------------------|----------------------------|----------------|---|
|  |          |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |                |   |
| GW-461-1-110117-(20)   | 11-01-17 | 1050 | Water  | 4              | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              | All dissolved samples field filtered 0.45uM |
| GW-542-2-110117  |          | 1210 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-542-2-110117-(20)   |          | 1210 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-462-2-110117  |          | 1150 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-462-2-110117-(20)   |          | 1150 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-443-1-110117  |          | 1235 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-443-1-110117-(20)   |          | 1235 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-512-1-110117  |          | 1315 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-512-1-110117-(20)   |          | 1315 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-444-2-110117  |          | 1350 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| GW-444-2-110117-(20)   |          | 1350 |        |                | X   | X  | X  | X   | X  | X  | X                                    | X                          | X              |   |
| Comments/Special Instructions  |          |      |        |                |   |  |  |   |  |  |                                      |                            |                |   |
| submit EDD to PIONEER<br>sing PIONEER EDD format<br>ill to Port of Tacoma<br>O#79227 |          |      |        |                |   |  |  |   |  |  |                                      |                            |                |   |
| Relinquished by:   |          |      |        |                | Relinquished by:                            |  |  |   |  | Received by:   |                                      |                            |                |   |
| (Signature) <i>[Signature]</i>   |          |      |        |                | (Signature) <i>[Signature]</i>              |  |  |   |  | (Signature) <i>[Signature]</i>                                   |                                      |                            |                |   |
| Printed Name: <b>Cube Kerner</b>   |          |      |        |                | Printed Name: <b>Stephanie Fiswi</b>        |  |  |   |  | Printed Name: _____  |                                      |                            |                |   |
| Company: <b>DOP</b>  |          |      |        |                | Company: <b>ARI</b>                         |  |  |   |  | Company: _____   |                                      |                            |                |   |
| Date & Time: <b>11-17 1625</b>   |          |      |        |                | Date & Time: <b>11/1/17 1625</b>            |  |  |   |  | Date & Time: _____   |                                      |                            |                |   |

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# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: **11.01.17**  
 Page: **3** of **3**  
 No. of Coolers: \_\_\_\_\_  
 Cooler Temps: \_\_\_\_\_

Turn-around Requested: **Normal**  
 ARI Assigned Number: **17K0014**  
 ARI Client Company: **Pioneer Technologies**  
 Phone: **360-570-1700**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kerner / D Pickering**

| Sample ID                     | Date  | Time  | Matrix | No. Containers | Analysis Requested                                    |  |  |   |  |  |   |                            | Notes/Comments                                    |   |
|-------------------------------|---|---|--------|----------------|---|--|--|---|--|--|---|----------------------------|---|---|
|                               |   |   |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A           | Dissolved As, Cu, Pb, Ni,<br>Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide, Nitrate,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1                  | Dissolved DOC<br>SM 5310 B |   |   |
| GW-5D1-3-110117               | 11.01.17  | 1500  | Water  | 4              | X   | X  | X  | X   | X  | X  | X   | X                          |   | All dissolved samples field filtered 0.45µm |
| GW-5D1-3-110117-(20)          |   | 1500  |        |                | X   | X  | X  | X   | X  | X  | X   | X                          |   |   |
| GW-6E7-3-110117               |   | 1505  |        |                | X   | X  | X  | X   | X  | X  | X   | X                          |   |   |
| GW-6E7-3-110117-(20)          |   | 1505  |        |                | X   | X  | X  | X   | X  | X  | X   | X                          |   |   |
| EB-110117                     |   | 1430  |        |                | X   | X  | X  | X   | X  | X  | X   | X                          |   |   |
| EB-110117-(20)                |   | 1430  |        |                | X   | X  | X  | X   | X  | X  | X   | X                          |   |   |
|                               |   |   |        |                |   |  |  |   |  |  |   |                            |   |   |
|                               |   |   |        |                |   |  |  |   |  |  |   |                            |   |   |
|                               |   |   |        |                |   |  |  |   |  |  |   |                            |   |   |
|                               |   |   |        |                |   |  |  |   |  |  |   |                            |   |   |
|                               |   |   |        |                |   |  |  |   |  |  |   |                            |   |   |
| Comments/Special Instructions | Relinquished by:<br>(Signature)<br><i>[Signature]</i> | Received by:<br>(Signature)<br><i>[Signature]</i> |        |                | Relinquished by:<br>(Signature)<br><i>[Signature]</i> |  | Received by:<br>(Signature)<br><i>[Signature]</i>    |   |  |  | Relinquished by:<br>(Signature)<br><i>[Signature]</i> |                            | Received by:<br>(Signature)<br><i>[Signature]</i> |   |
| Submit EDD to PIONEER         | Printed Name:<br><b>Cyke Kerner</b>                   | Printed Name:<br><b>Stephanie Fiswal</b>          |        |                | Printed Name:<br><b>Stephanie Fiswal</b>              |  | Printed Name:<br><b>Stephanie Fiswal</b>             |   |  |  | Printed Name:<br><b>Stephanie Fiswal</b>              |                            | Printed Name:<br><b>Stephanie Fiswal</b>          |   |
| Sing PIONEER EDD format       | Company:<br><b>DOF</b>                                | Company:<br><b>DOF</b>                            |        |                | Company:<br><b>ARI</b>                                |  | Company:<br><b>ARI</b>                               |   |  |  | Company:<br><b>ARI</b>                                |                            | Company:<br><b>ARI</b>                            |   |
| ill to Port of Tacoma         | Date & Time:<br><b>11-17</b>                          | Date & Time:<br><b>11/1/17</b>                    |        |                | Date & Time:<br><b>11/1/17</b>                        |  | Date & Time:<br><b>11/1/17</b>                       |   |  |  | Date & Time:<br><b>11/1/17</b>                        |                            | Date & Time:<br><b>11/1/17</b>                    |   |
| O#79227                       |   |   |        |                |   |  |  |   |  |  |   |                            |   |   |

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WORK ORDER

17K0014

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID           | Container Type                              | pH             |
|------------------------|---|----------------|
| 17K0014-01 A <i>sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-01 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-01 C           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-02 A           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17K0014-02 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17K0014-03 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-03 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-03 C           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-04 A           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17K0014-04 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17K0014-05 A <i>sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-05 B <i>sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-05 C           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-05 D           | HDPE NM, 500 mL, 1:1 HNO3                   | <i>L2 pass</i> |
| 17K0014-06 A           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17K0014-06 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17K0014-06 C           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>L2 pass</i> |
| 17K0014-06 D           | HDPE NM, 500 mL, 1:1 HNO3 (FF)              | <i>L2 pass</i> |
| 17K0014-07 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 C <i>pb</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 D           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 E           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 F <i>sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 G           | HDPE NM, 500 mL, 1:1 HNO3                   | <i>L2 pass</i> |
| 17K0014-08 A           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17K0014-08 B           | Small OJ, 500 mL, no headspace <i>FF</i>    |                |
| 17K0014-08 C           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>L2 pass</i> |
| 17K0014-08 D           | HDPE NM, 500 mL, 1:1 HNO3 (FF)              | <i>L2 pass</i> |
| 17K0014-09 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-09 B           | VOA Vial, Clear, 40 mL, HCL                 |                |



WORK ORDER

17K0014

|   |                                      |   |         |
|---|--------------------------------------|---|---------|
| <b>Client: Pioneer Technologies Corporation</b>                 |                                      | <b>Project Manager: Amanda Volgardsen</b>                         |         |
| <b>Project: Port of Tacoma Arkema- FS Data Gap Investigatio</b> |                                      | <b>Project Number: Port of Tacoma Arkema- FS Data Gap Investi</b> |         |
| 17K0014-09 C  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-09 D  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-09 E  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-09 F  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-09 G  | HDPE NM, 500 mL, 1:1 HNO3            |   | L2 pass |
| 17K0014-10 A  | Large OJ, 1000 mL FF                 |   |         |
| 17K0014-10 B  | Small OJ, 500 mL FF                  |   |         |
| 17K0014-10 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF | <del>FF</del>   | >2 fail |
| 17K0014-10 D  | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |   | >2 fail |
| 17K0014-11 A  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-11 B  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-11 C  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-11 D  | HDPE NM, 500 mL, 1:1 HNO3            |   | L2 pass |
| 17K0014-12 A  | Large OJ, 1000 mL FF                 |   |         |
| 17K0014-12 B  | Small OJ, 500 mL FF                  |   |         |
| 17K0014-12 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF |   | L2 pass |
| 17K0014-12 D  | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |   | L2 pass |
| 17K0014-13 A  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-13 B  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-13 C  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-13 D  | HDPE NM, 500 mL, 1:1 HNO3            |   | >2 fail |
| 17K0014-14 A  | Large OJ, 1000 mL FF                 |   |         |
| 17K0014-14 B  | Small OJ, 500 mL FF                  |   |         |
| 17K0014-14 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF |   | L2 pass |
| 17K0014-14 D  | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |   | >2 fail |
| 17K0014-15 A  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-15 B  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-15 C  | VOA Vial, Clear, 40 mL, HCL          |   |         |
| 17K0014-15 D  | pb HDPE NM, 500 mL, 1:1 HNO3         |   | L2 pass |
| 17K0014-16 A  | Large OJ, 1000 mL FF                 |   |         |
| 17K0014-16 B  | Small OJ, 500 mL FF                  |   |         |
| 17K0014-16 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF |   | L2 pass |
| 17K0014-16 D  | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |   | >2 fail |
| 17K0014-17 A  | VOA Vial, Clear, 40 mL, HCL          |   |         |





WORK ORDER

17K0014

|  |                                       |  |
|--|---------------------------------------|--|
| Client: Pioneer Technologies Corporation                 |                                       | Project Manager: Amanda Volgardsen                         |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                       | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |
| 17K0014-17 B   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-17 C   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-17 D   | HDPE NM, 500 mL, 1:1 HNO3             | >2 fail  |
| 17K0014-18 A   | Large OJ, 1000 mL FF                  |  |
| 17K0014-18 B   | Small OJ, 500 mL FF                   |  |
| 17K0014-18 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF  | >2 fail  |
| 17K0014-18 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)        | >2 fail  |
| 17K0014-19 A   | <i>sm</i> VOA Vial, Clear, 40 mL, HCL |  |
| 17K0014-19 B   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-19 C   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-19 D   | HDPE NM, 500 mL, 1:1 HNO3             | >2 fail  |
| 17K0014-20 A   | Large OJ, 1000 mL FF                  |  |
| 17K0014-20 B   | Small OJ, 500 mL FF                   |  |
| 17K0014-20 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF  | >2 fail  |
| 17K0014-20 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)        | >2 fail  |
| 17K0014-21 A   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-21 B   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-21 C   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-21 D   | HDPE NM, 500 mL, 1:1 HNO3             | >2 fail  |
| 17K0014-22 A   | Large OJ, 1000 mL FF                  |  |
| 17K0014-22 B   | Small OJ, 500 mL FF                   |  |
| 17K0014-22 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF  | <2 pass  |
| 17K0014-22 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)        | >2 fail  |
| 17K0014-23 A   | <i>sm</i> VOA Vial, Clear, 40 mL, HCL |  |
| 17K0014-23 B   | <i>sm</i> VOA Vial, Clear, 40 mL, HCL |  |
| 17K0014-23 C   | <i>sm</i> VOA Vial, Clear, 40 mL, HCL |  |
| 17K0014-23 D   | HDPE NM, 500 mL, 1:1 HNO3             | >2 fail  |
| 17K0014-24 A   | Large OJ, 1000 mL FF                  |  |
| 17K0014-24 B   | Small OJ, 500 mL FF                   |  |
| 17K0014-24 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF  | <2 pass  |
| 17K0014-24 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)        | >2 fail  |
| 17K0014-25 A   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-25 B   | VOA Vial, Clear, 40 mL, HCL           |  |
| 17K0014-25 C   | VOA Vial, Clear, 40 mL, HCL           |  |



WORK ORDER

17K0014

|  |                                      |  |
|--|--------------------------------------|--|
| Client: Pioneer Technologies Corporation                 |                                      | Project Manager: Amanda Volgardsen                         |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                      | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |
| 17K0014-25 D   | HDPE NM, 500 mL, 1:1 HNO3            | CZ pass  |
| 17K0014-26 A   | Large OJ, 1000 mL FF                 |  |
| 17K0014-26 B   | Small OJ, 500 mL FF                  |  |
| 17K0014-26 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | CZ pass  |
| 17K0014-26 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       | CZ pass  |
| 17K0014-27 A   | VOA Vial, Clear, 40 mL, HCL          |  |
| 17K0014-27 B   | VOA Vial, Clear, 40 mL, HCL          |  |
| 17K0014-27 C   | VOA Vial, Clear, 40 mL, HCL          |  |
| 17K0014-27 D   | HDPE NM, 500 mL, 1:1 HNO3            | CZ pass  |
| 17K0014-28 A   | Large OJ, 1000 mL FF                 |  |
| 17K0014-28 B   | Small OJ, 500 mL FF                  |  |
| 17K0014-28 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | CZ pass  |
| 17K0014-28 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       | CZ pass  |
| 17K0014-29 A   | VOA Vial, Clear, 40 mL, HCL          |  |

SF

11/1/17  
Date

Preservation Confirmed By \_\_\_\_\_

Date \_\_\_\_\_





# Cooler Receipt Form

ARI Client: Dof

Project Name: Arkema FS DG Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17K0014

Tracking No: \_\_\_\_\_ (NA)

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO

Were custody papers included with the cooler? ..... YES NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time: 1625 7.7 7.3

Temp Gun ID#: D002565

Cooler Accepted by: SF Date: 11/1/17 Time: 1625

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES NO

Were all bottles sealed in individual plastic bags? ..... YES NO

Did all bottles arrive in good condition (unbroken)? ..... YES NO

Were all bottle labels complete and legible? ..... YES NO

Did the number of containers listed on COC match with the number of containers received? ..... YES NO

Did all bottle labels and tags agree with custody papers? ..... YES NO

Were all bottles used correct for the requested analyses? ..... YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO

Were all VOC vials free of air bubbles? ..... NA YES NO

Was sufficient amount of sample sent in each bottle? ..... YES NO

Date VOC Trip Blank was made at ARI ..... NA 10/23/17

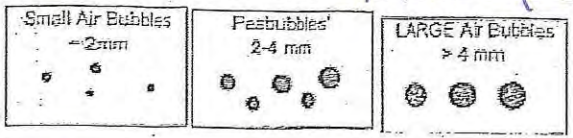
Was Sample Split by ARI : NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: SF Date: 11/1/17 Time: 1709

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle           | Sample ID on COC        | Sample ID on Bottle  | Sample ID on COC     |
|-------------------------------|-------------------------|----------------------|----------------------|
| 01A-C GW-129+65-1-103117      | GW-129+65-1-103017      | GW-SI1-1-110117-(20) | GW-SI2-1-110117-(20) |
| 02A-B GW-129+65-1-103117-(20) | GW-129+65-1-103017-(20) |                      |                      |
| 04A-B GW-128+30-1-103117-(20) | GW-128+30-1-103017-(20) |                      |                      |
| 19A-D GW-SI2-1-110117         | GW-SI1-1-110117         |                      |                      |

Additional Notes, Discrepancies, & Resolutions: Sample dates on 01A, 01B, 01C, 02A, 02B, 04A, and 04B say 10-30-17 COC says 10-31-17  
TB not on COC (samples GW-129+65-1-103117-(20) and GW-128+30-1-103117-(20) say 3 containers



Small → "sm" (< 2 mm) when DOC container was brought in with yesterdaye samples should say 2 containers on COC

Peabubbles → "pb" (2 to < 4 mm)

Large → "lg" (4 to < 6 mm)

Headspace → "hs" (> 6 mm)

0016F 3/2/10 (Samples GW-662-3-110117 and GW-SI1-1-110117 both say 4 containers on COC when they have 7 containers airbubbles on preservation)





# Cooler Temperature Compliance Form

| Cooler#:                  | Temperature(°C): |             |
|---------------------------|------------------|-------------|
| 1                         | 7.7              |             |
| Sample ID                 | Bottle Count     | Bottle Type |
| Samples received above 6° |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |

| Cooler#:                  | Temperature(°C): |             |
|---------------------------|------------------|-------------|
| 2                         | 7.3              |             |
| Sample ID                 | Bottle Count     | Bottle Type |
| Samples received above 6° |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |
|                           |                  |             |

| Cooler#:  | Temperature(°C): |             |
|-----------|------------------|-------------|
|           |                  |             |
| Sample ID | Bottle Count     | Bottle Type |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |

| Cooler#:  | Temperature(°C): |             |
|-----------|------------------|-------------|
|           |                  |             |
| Sample ID | Bottle Count     | Bottle Type |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |

Completed by: SF Date: 11/1/17 Time: 1625



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID               | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-------------------------|---------------|--------|-------------------|-------------------|
| GW-129+65-1-103117      | 17K0014-01    | Water  | 31-Oct-2017 09:30 | 01-Nov-2017 16:25 |
| GW-129+65-1-103117-(20) | 17K0014-02    | Water  | 31-Oct-2017 09:30 | 01-Nov-2017 16:25 |
| GW-128+30-1-103117      | 17K0014-03    | Water  | 31-Oct-2017 10:45 | 01-Nov-2017 16:25 |
| GW-128+30-1-103117-(20) | 17K0014-04    | Water  | 31-Oct-2017 10:45 | 01-Nov-2017 16:25 |
| GW-5G1-3-110117         | 17K0014-05    | Water  | 01-Nov-2017 09:20 | 01-Nov-2017 16:25 |
| GW-5G1-3-110117-(20)    | 17K0014-06    | Water  | 01-Nov-2017 09:20 | 01-Nov-2017 16:25 |
| GW-6G2-3-110117         | 17K0014-07    | Water  | 01-Nov-2017 09:15 | 01-Nov-2017 16:25 |
| GW-6G2-3-110117-(20)    | 17K0014-08    | Water  | 01-Nov-2017 09:15 | 01-Nov-2017 16:25 |
| GW-5H1-1-110117         | 17K0014-09    | Water  | 01-Nov-2017 10:55 | 01-Nov-2017 16:25 |
| GW-5H1-1-110117-(20)    | 17K0014-10    | Water  | 01-Nov-2017 10:55 | 01-Nov-2017 16:25 |
| GW-4G1-1-110117         | 17K0014-11    | Water  | 01-Nov-2017 10:50 | 01-Nov-2017 16:25 |
| GW-4G1-1-110117-(20)    | 17K0014-12    | Water  | 01-Nov-2017 10:50 | 01-Nov-2017 16:25 |
| GW-5H2-2-110117         | 17K0014-13    | Water  | 01-Nov-2017 12:10 | 01-Nov-2017 16:25 |
| GW-5H2-2-110117-(20)    | 17K0014-14    | Water  | 01-Nov-2017 12:10 | 01-Nov-2017 16:25 |
| GW-4G2-2-110117         | 17K0014-15    | Water  | 01-Nov-2017 11:50 | 01-Nov-2017 16:25 |
| GW-4G2-2-110117-(20)    | 17K0014-16    | Water  | 01-Nov-2017 11:50 | 01-Nov-2017 16:25 |
| GW-4H3-1-110117         | 17K0014-17    | Water  | 01-Nov-2017 12:35 | 01-Nov-2017 16:25 |
| GW-4H3-1-110117-(20)    | 17K0014-18    | Water  | 01-Nov-2017 12:35 | 01-Nov-2017 16:25 |
| GW-5I2-1-110117         | 17K0014-19    | Water  | 01-Nov-2017 13:15 | 01-Nov-2017 16:25 |
| GW-5I2-1-110117-(20)    | 17K0014-20    | Water  | 01-Nov-2017 13:15 | 01-Nov-2017 16:25 |
| GW-4H4-2-110117         | 17K0014-21    | Water  | 01-Nov-2017 13:50 | 01-Nov-2017 16:25 |
| GW-4H4-2-110117-(20)    | 17K0014-22    | Water  | 01-Nov-2017 13:50 | 01-Nov-2017 16:25 |
| GW-5D1-3-110117         | 17K0014-23    | Water  | 01-Nov-2017 15:00 | 01-Nov-2017 16:25 |
| GW-5D1-3-110117-(20)    | 17K0014-24    | Water  | 01-Nov-2017 15:00 | 01-Nov-2017 16:25 |
| GW-6E7-3-110117         | 17K0014-25    | Water  | 01-Nov-2017 15:05 | 01-Nov-2017 16:25 |
| GW-6E7-3-110117-(20)    | 17K0014-26    | Water  | 01-Nov-2017 15:05 | 01-Nov-2017 16:25 |
| EB-110117               | 17K0014-27    | Water  | 01-Nov-2017 14:30 | 01-Nov-2017 16:25 |
| EB-110117-(20)          | 17K0014-28    | Water  | 01-Nov-2017 14:30 | 01-Nov-2017 16:25 |
| TB                      | 17K0014-29    | Water  | 31-Oct-2017 00:00 | 01-Nov-2017 16:25 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received November 1, 2017 under ARI workorder 17K0014. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The initial calibration verification (ICV) is outside of control limits high for Vinyl Chloride. Associated samples and QC have been flagged with a "Q" qualifier. No further corrective action was taken.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

A matrix spike and matrix spike duplicate were prepared in conjunction with sample GW-6G2-3-110117. The matrix spike/matrix spike duplicate percent recoveries and RPD were within QC limits.

A matrix spike and matrix spike duplicate were prepared in conjunction with sample GW-5H1-1-110117. The matrix spike/matrix spike duplicate percent recoveries and RPD were within QC limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-6G2-3-110117. The duplicate RPD was within QC limits. The matrix spike has high spike recovery for Mercury. The results are advisory. No corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-5H1-1-110117. The matrix spike percent recoveries and duplicate RPD were within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

A matrix spike and duplicate were prepared in conjunction with sample GW-6G2-3-110117-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5H1-1-110117-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-4H3-1-110117. The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **Total and Dissolved Metals - EPA Method 6020A**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-6G2-3-110117. The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

A matrix spike, matrix spike duplicate and duplicate were prepared in conjunction with sample GW-5H1-1-110117. The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-6G2-3-110117-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5H1-1-110117-(20). The matrix spike/matrix spike duplicate and duplicate percent recoveries and RPD were within QC limits.

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFK0416 has Iron and Sodium detected below the reporting limits, but above the method detection limits. The Iron and Sodium have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

On all of the QC Sodium has a concentration that exceeds the upper calibration limit, and has been flagged with an "E" qualifier.



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Reported:  
10-Jan-2018 14:05

A matrix spike and duplicate were prepared in conjunction with sample GW-5H1-1-110117-(20). The duplicate RPD were within QC limits. The matrix spike has a natural concentration of Sodium that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. This is due to the high salt content of the samples. The Sodium has been flagged with an "HC" qualifier. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-5H1-1-110117-(20). The duplicate has an Aluminum concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. The Aluminum has been flagged with an "L" qualifier on the duplicate. The matrix spike has natural concentrations of Iron and Manganese that are so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. This is likely matrix interference. These metals have been flagged with an "HC" qualifier on the matrix spike. No further corrective actions were taken.

#### **Anions - EPA Method 300.0**

Various samples were reanalyzed outside of the recommended holding time after an initial run due to instrument maintenance. These samples have been flagged with an "H" qualifier.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS BFK0096 has low percent recovery for O-Phos. This is likely due to chromatographic interference and matrix interference. All other LCS percent recoveries were within control limits. No corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-129+65-1-103117-(20). The duplicate RPD were within QC limits. The matrix spike has little to no spike recovery for O-Phos. The peak was not easily identifiable as O-Phos due to chromatographic interference. The QC was reanalyzed on another sample. The results are advisory. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample GW-6G2-3-110117-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5H1-1-110117-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

Due to pH issues sample GW-4H3-1-110117-(20) was not analyzed.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

A duplicate was prepared in conjunction with sampe GW-6G2-3-110117-(20). The duplicate RPD was within QC limits.

A duplicate was prepared in conjunction with sampe GW-5H1-1-110117-(20). The duplicate RPD was within QC limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sampe GW-6G2-3-110117-(20). The duplicate RPD was within QC limits.

A duplicate was prepared in conjunction with sampe GW-5H1-1-110117-(20). The duplicate RPD was within QC limits.

#### **Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Due to matrix interference sample GW-4H3-1-110117-(20) was not analyzed.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample GW-6G2-3-110117-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5H1-1-110117-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.



WORK ORDER

17K0014

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID           | Container Type                              | pH             |
|------------------------|---|----------------|
| 17K0014-01 A <i>Sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-01 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-01 C           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-02 A           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17K0014-02 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17K0014-03 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-03 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-03 C           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-04 A           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17K0014-04 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17K0014-05 A <i>Sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-05 B <i>Sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-05 C           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-05 D           | HDPE NM, 500 mL, 1:1 HNO3                   |                |
| 17K0014-06 A           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17K0014-06 B           | Small OJ, 500 mL <i>FF</i>                  |                |
| 17K0014-06 C           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>lz pass</i> |
| 17K0014-06 D           | HDPE NM, 500 mL, 1:1 HNO3 ( <i>FF</i> )     |                |
| 17K0014-07 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 B           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 C <i>pb</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 D           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 E           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 F <i>Sm</i> | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-07 G           | HDPE NM, 500 mL, 1:1 HNO3                   |                |
| 17K0014-08 A           | Large OJ, 1000 mL <i>FF</i>                 |                |
| 17K0014-08 B           | Small OJ, 500 mL, no headspace <i>FF</i>    |                |
| 17K0014-08 C           | Glass NM, Amber, 250 mL, 9N H2SO4 <i>FF</i> | <i>lz pass</i> |
| 17K0014-08 D           | HDPE NM, 500 mL, 1:1 HNO3 ( <i>FF</i> )     |                |
| 17K0014-09 A           | VOA Vial, Clear, 40 mL, HCL                 |                |
| 17K0014-09 B           | VOA Vial, Clear, 40 mL, HCL                 |                |



WORK ORDER

17K0014

|  |  |
|--|--|
| Client: Pioneer Technologies Corporation                 | Project Manager: Amanda Volgardsen                         |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |

|              |                                   |  |
|--------------|-----------------------------------|--|
| 17K0014-09 C | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-09 D | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-09 E | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-09 F | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-09 G | HDPE NM, 500 mL, 1:1 HNO3         |  |
| 17K0014-10 A | Large OJ, 1000 mL                 | FF   |
| 17K0014-10 B | Small OJ, 500 mL                  | FF   |
| 17K0014-10 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF <del>SFX</del> → 2 fail <del>2 AW</del> |
| 17K0014-10 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | 11/1/17                                    |
| 17K0014-11 A | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-11 B | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-11 C | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-11 D | HDPE NM, 500 mL, 1:1 HNO3         |  |
| 17K0014-12 A | Large OJ, 1000 mL                 | FF   |
| 17K0014-12 B | Small OJ, 500 mL                  | FF   |
| 17K0014-12 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF 22 pass                                 |
| 17K0014-12 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    |  |
| 17K0014-13 A | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-13 B | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-13 C | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-13 D | HDPE NM, 500 mL, 1:1 HNO3         |  |
| 17K0014-14 A | Large OJ, 1000 mL                 | FF   |
| 17K0014-14 B | Small OJ, 500 mL                  | FF   |
| 17K0014-14 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF 22 pass                                 |
| 17K0014-14 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    |  |
| 17K0014-15 A | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-15 B | VOA Vial, Clear, 40 mL, HCL       |  |
| 17K0014-15 C | pb VOA Vial, Clear, 40 mL, HCL    |  |
| 17K0014-15 D | HDPE NM, 500 mL, 1:1 HNO3         |  |
| 17K0014-16 A | Large OJ, 1000 mL                 | FF   |
| 17K0014-16 B | Small OJ, 500 mL                  | FF   |
| 17K0014-16 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF 22 pass                                 |
| 17K0014-16 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    |  |
| 17K0014-17 A | VOA Vial, Clear, 40 mL, HCL       |  |





WORK ORDER

17K0014

|  |                                      |  |               |
|--|--------------------------------------|--|---------------|
| Client: Pioneer Technologies Corporation                 |                                      | Project Manager: Amanda Volgardsen                         |               |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                      | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |               |
| 17K0014-17 B   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-17 C   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-17 D   | HDPE NM, 500 mL, 1:1 HNO3            |  |               |
| 17K0014-18 A   | Large OJ, 1000 mL FF                 |  |               |
| 17K0014-18 B   | Small OJ, 500 mL FF                  |  |               |
| 17K0014-18 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | >> fail  | << AW 11/1/17 |
| 17K0014-18 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |  |               |
| 17K0014-19 A   | Sm VOA Vial, Clear, 40 mL, HCL       |  |               |
| 17K0014-19 B   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-19 C   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-19 D   | HDPE NM, 500 mL, 1:1 HNO3            |  |               |
| 17K0014-20 A   | Large OJ, 1000 mL FF                 |  |               |
| 17K0014-20 B   | Small OJ, 500 mL FF                  |  |               |
| 17K0014-20 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | >> fail  | << 11/1/17    |
| 17K0014-20 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |  |               |
| 17K0014-21 A   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-21 B   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-21 C   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-21 D   | HDPE NM, 500 mL, 1:1 HNO3            |  |               |
| 17K0014-22 A   | Large OJ, 1000 mL FF                 |  |               |
| 17K0014-22 B   | Small OJ, 500 mL FF                  |  |               |
| 17K0014-22 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | << pass  |               |
| 17K0014-22 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |  |               |
| 17K0014-23 A   | Sm VOA Vial, Clear, 40 mL, HCL       |  |               |
| 17K0014-23 B   | Sm VOA Vial, Clear, 40 mL, HCL       |  |               |
| 17K0014-23 C   | Sm VOA Vial, Clear, 40 mL, HCL       |  |               |
| 17K0014-23 D   | HDPE NM, 500 mL, 1:1 HNO3            |  |               |
| 17K0014-24 A   | Large OJ, 1000 mL FF                 |  |               |
| 17K0014-24 B   | Small OJ, 500 mL FF                  |  |               |
| 17K0014-24 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | << pass  |               |
| 17K0014-24 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |  |               |
| 17K0014-25 A   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-25 B   | VOA Vial, Clear, 40 mL, HCL          |  |               |
| 17K0014-25 C   | VOA Vial, Clear, 40 mL, HCL          |  |               |



WORK ORDER

17K0014

|  |                                      |  |      |
|--|--------------------------------------|--|------|
| Client: Pioneer Technologies Corporation                 |                                      | Project Manager: Amanda Volgardsen                         |      |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                      | Project Number: Port of Tacoma Arkema- FS Data Gap Investi |      |
| 17K0014-25 D   | HDPE NM, 500 mL, 1:1 HNO3            |  |      |
| 17K0014-26 A   | Large OJ, 1000 mL FF                 |  |      |
| 17K0014-26 B   | Small OJ, 500 mL FF                  |  |      |
| 17K0014-26 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | C2   | pass |
| 17K0014-26 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |  |      |
| 17K0014-27 A   | VOA Vial, Clear, 40 mL, HCL          |  |      |
| 17K0014-27 B   | VOA Vial, Clear, 40 mL, HCL          |  |      |
| 17K0014-27 C   | VOA Vial, Clear, 40 mL, HCL          |  |      |
| 17K0014-27 D   | HDPE NM, 500 mL, 1:1 HNO3            |  |      |
| 17K0014-28 A   | Large OJ, 1000 mL FF                 |  |      |
| 17K0014-28 B   | Small OJ, 500 mL FF                  |  |      |
| 17K0014-28 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | C2   | pass |
| 17K0014-28 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       |  |      |
| 17K0014-29 A   | VOA Vial, Clear, 40 mL, HCL          |  |      |

SF

11/1/17  
Date

Preservation Confirmed By



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-129+65-1-103117**  
**17K0014-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 09:30  
Analyzed: 06-Nov-2017 16:15

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.06</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 118   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.5  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 85.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-129+65-1-103117-(20)**  
**17K0014-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 09:30  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>17200</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-129+65-1-103117-(20)**  
**17K0014-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:30  
Analyzed: 03-Nov-2017 15:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.635</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-129+65-1-103117-(20)**  
**17K0014-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/31/2017 09:30  
Analyzed: 06-Nov-2017 16:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>91.3</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>91.3</b> | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-129+65-1-103117-(20)**  
**17K0014-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:30  
Analyzed: 10-Nov-2017 12:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>36.1</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-129+65-1-103117-(20)**  
**17K0014-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:30  
Analyzed: 10-Nov-2017 20:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 4000     | 400             | <b>10200</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-129+65-1-103117-(20)**  
**17K0014-02RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 09:30  
Analyzed: 12-Nov-2017 00:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1460</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-128+30-1-103117**  
**17K0014-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 10/31/2017 10:45  
Analyzed: 06-Nov-2017 16:35

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.04</b> | ug/L  | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 119   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 93.5  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 84.5  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 107   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-128+30-1-103117-(20)**  
**17K0014-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 10/31/2017 10:45  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>17900</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-128+30-1-103117-(20)**  
**17K0014-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:45  
Analyzed: 03-Nov-2017 16:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.739</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-128+30-1-103117-(20)**  
**17K0014-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 10/31/2017 10:45  
Analyzed: 06-Nov-2017 16:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 89.1   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 89.1   | mg/L CaCO3 |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-128+30-1-103117-(20)**  
**17K0014-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:45  
Analyzed: 10-Nov-2017 13:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>36.1</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-128+30-1-103117-(20)**  
**17K0014-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:45  
Analyzed: 10-Nov-2017 21:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>11300</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-128+30-1-103117-(20)**  
**17K0014-04RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 10/31/2017 10:45  
Analyzed: 12-Nov-2017 02:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1510</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-5G1-3-110117**  
**17K0014-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/01/2017 09:20  
Analyzed: 06-Nov-2017 16:55

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 120   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 84.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105   | %     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117**  
**17K0014-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 09:20  
Analyzed: 16-Nov-2017 19:30

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117**  
**17K0014-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 09:20  
Analyzed: 15-Nov-2017 18:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>1.11</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | ND          | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117**  
**17K0014-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 09:20  
Analyzed: 13-Nov-2017 13:57

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 09:20  
Analyzed: 15-Nov-2017 14:40

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>134</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>0.222</b> | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>348</b>   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>122</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>21.8</b>  | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>2140</b>  | mg/L  | D     |





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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 09:20  
Analyzed: 15-Nov-2017 00:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 09:20  
Analyzed: 15-Nov-2017 00:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>0.915</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | ND           | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 09:20  
Analyzed: 13-Nov-2017 14:39

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 09:20  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>6640</b> | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 09:20  
Analyzed: 03-Nov-2017 17:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | 1.65   | mg-P/L | H, D  |



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Reported:  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 09:20  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 991    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 991    | mg/L CaCO3 |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 09:20  
Analyzed: 17-Nov-2017 08:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>11.6</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 09:20  
Analyzed: 15-Nov-2017 16:51

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Manganese, Dissolved | 7439-96-5  | 20       | 0.0068          | 0.0200          | <b>0.306</b> | mg/L  | D     |





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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 09:20  
Analyzed: 10-Nov-2017 13:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>12.0</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 09:20  
Analyzed: 10-Nov-2017 19:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | <b>327</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5G1-3-110117-(20)**  
**17K0014-06RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 09:20  
Analyzed: 10-Nov-2017 22:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>3470</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-6G2-3-110117**  
**17K0014-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/01/2017 09:15  
Analyzed: 06-Nov-2017 17:16

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 119 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 93.4 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 83.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105 %  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117**  
**17K0014-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 09:15  
Analyzed: 16-Nov-2017 18:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117**  
**17K0014-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 09:15  
Analyzed: 15-Nov-2017 18:22

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.577</b> | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.200</b> | ug/L  | J     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117**  
**17K0014-07 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 09:15  
Analyzed: 13-Nov-2017 13:59

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 09:15  
Analyzed: 15-Nov-2017 13:56

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>123</b>    | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.128</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>119</b>    | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0648</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>22.0</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>21.3</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>188</b>    | mg/L  |       |





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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 09:15  
Analyzed: 15-Nov-2017 00:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 09:15  
Analyzed: 15-Nov-2017 00:19

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.285</b> | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.107</b> | ug/L  | J     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 09:15  
Analyzed: 13-Nov-2017 14:45

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295  
Prepared: 10-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 09:15  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 50 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1360</b> | mg/L  |       |



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Reported:  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 09:15  
Analyzed: 03-Nov-2017 20:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | H, U  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 09:15  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 335    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 335    | mg/L CaCO3 |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 09:15  
Analyzed: 17-Nov-2017 09:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.95</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 09:15  
Analyzed: 11-Nov-2017 05:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | 2.17   | mg/L  | D     |





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**Reported:**  
10-Jan-2018 14:05

**GW-6G2-3-110117- (20)**  
**17K0014-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 09:15  
Analyzed: 11-Nov-2017 19:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>649</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-5H1-1-110117**  
**17K0014-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/01/2017 10:55  
Analyzed: 06-Nov-2017 17:36

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 120   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 84.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117**  
**17K0014-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 10:55  
Analyzed: 16-Nov-2017 18:18

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.940</b> | ug/L  |       |



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Reported:  
10-Jan-2018 14:05

**GW-5H1-1-110117**  
**17K0014-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 10:55  
Analyzed: 15-Nov-2017 17:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>46.8</b> | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>7.38</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>4.86</b> | ug/L  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117**  
**17K0014-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 10:55  
Analyzed: 13-Nov-2017 14:04

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

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Reported:  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 10:55  
Analyzed: 15-Nov-2017 14:10

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.0737</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>36.9</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>11.3</b>   | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>18.4</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>3.04</b>   | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>3.50</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>28.3</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>136</b>    | mg/L  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 10:55  
Analyzed: 15-Nov-2017 01:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.607</b> | ug/L  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 10:55  
Analyzed: 15-Nov-2017 01:28

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>56.1</b> | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>4.38</b> | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>4.71</b> | ug/L  |       |





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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 10:55  
Analyzed: 13-Nov-2017 14:50

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 10:55  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 100 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>541</b> | mg/L  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 10:55  
Analyzed: 03-Nov-2017 21:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>1.29</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.77</b> | mg-P/L | H, D  |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 10:55  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 375    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 375    | mg/L CaCO3 |       |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 10:55  
Analyzed: 17-Nov-2017 10:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>10.4</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 10:55  
Analyzed: 11-Nov-2017 06:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
10-Jan-2018 14:05

**GW-5H1-1-110117-(20)**  
**17K0014-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 10:55  
Analyzed: 11-Nov-2017 16:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 20       | 2.00            | 37.5   | mg/L  | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | 33.3   | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
10-Jan-2018 14:05

**GW-4G1-1-110117**  
**17K0014-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/01/2017 10:50  
Analyzed: 06-Nov-2017 17:56

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 117   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.0  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 84.0  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117**  
**17K0014-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 10:50  
Analyzed: 16-Nov-2017 19:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>1.91</b> | ug/L  |       |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117**  
**17K0014-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 10:50  
Analyzed: 15-Nov-2017 19:14

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>159</b>  | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>10.1</b> | ug/L  |       |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>2.99</b> | ug/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117**  
**17K0014-11 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 10:50  
Analyzed: 13-Nov-2017 14:13

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 10:50  
Analyzed: 15-Nov-2017 13:09

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | <b>0.132</b> | mg/L  |       |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>9.18</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>1.03</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>8.32</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.165</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>5.43</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>20.2</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>239</b>   | mg/L  |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 10:50  
Analyzed: 15-Nov-2017 01:18

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.946</b> | ug/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Reported:  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 10:50  
Analyzed: 15-Nov-2017 01:18

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | 145    | ug/L  |       |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | 2.27   | ug/L  |       |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | 1.95   | ug/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 10:50  
Analyzed: 13-Nov-2017 14:55

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295  
Prepared: 10-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 10:50  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 100 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>676</b> | mg/L  |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
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Reported:  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 10:50  
Analyzed: 03-Nov-2017 17:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.858</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>1.19</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>2.67</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 10:50  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 452    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 452    | mg/L CaCO3 |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 10:50  
Analyzed: 17-Nov-2017 12:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>22.6</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 10:50  
Analyzed: 10-Nov-2017 14:29

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>0.522</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4G1-1-110117-(20)**  
**17K0014-12RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 10:50  
Analyzed: 10-Nov-2017 22:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 50       | 5.00            | <b>82.7</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-5H2-2-110117**  
**17K0014-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/01/2017 12:10  
Analyzed: 06-Nov-2017 18:16

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 124   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.7  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 83.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117**  
**17K0014-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 12:10  
Analyzed: 16-Nov-2017 19:25

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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Reported:  
10-Jan-2018 14:05

**GW-5H2-2-110117**  
**17K0014-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 12:10  
Analyzed: 15-Nov-2017 18:54

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>2.97</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.330</b> | ug/L  | J, D  |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117**  
**17K0014-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 12:10  
Analyzed: 13-Nov-2017 14:14

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 12:10  
Analyzed: 15-Nov-2017 14:46

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0228</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>122</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>2.49</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>260</b>    | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>107</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>20.4</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>2570</b>   | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 12:10  
Analyzed: 15-Nov-2017 00:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 12:10  
Analyzed: 15-Nov-2017 00:59

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>1.53</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.385</b> | ug/L  | J, D  |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 12:10  
Analyzed: 13-Nov-2017 15:01

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295  
Prepared: 10-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 12:10  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>7300</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 12:10  
Analyzed: 03-Nov-2017 14:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.906</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>1.24</b> | mg-P/L | H, D  |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 12:10  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1520</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1520</b> | mg/L CaCO3 |       |





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**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 12:10  
Analyzed: 17-Nov-2017 12:39

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>30.8</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 12:10  
Analyzed: 15-Nov-2017 17:02

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Manganese, Dissolved | 7439-96-5  | 50       | 0.0170          | 0.0500          | <b>1.03</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 12:10  
Analyzed: 10-Nov-2017 14:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>14.8</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 12:10  
Analyzed: 10-Nov-2017 19:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | <b>88.0</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
10-Jan-2018 14:05

**GW-5H2-2-110117-(20)**  
**17K0014-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 12:10  
Analyzed: 10-Nov-2017 23:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>3810</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-4G2-2-110117**  
**17K0014-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/01/2017 11:50  
Analyzed: 06-Nov-2017 18:37

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 120   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 82.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105   | %     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117**  
**17K0014-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 11:50  
Analyzed: 16-Nov-2017 19:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 2        | 0.136           | 0.200           | <b>0.634</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117**  
**17K0014-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 11:50  
Analyzed: 15-Nov-2017 19:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>12.3</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>2.41</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>1.10</b> | ug/L  | D     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117**  
**17K0014-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 11:50  
Analyzed: 13-Nov-2017 14:16

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Reported:  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 11:50  
Analyzed: 15-Nov-2017 14:52

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0678</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>47.6</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>8.20</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>64.4</b>   | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>42.2</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>21.6</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>784</b>    | mg/L  | D     |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>10-Jan-2018 14:05 |
|--|--|---------------------------------------|

**GW-4G2-2-110117-(20)**  
**17K0014-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 11:50  
Analyzed: 15-Nov-2017 01:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



Pioneer Technologies Corporation  
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Reported:  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 11:50  
Analyzed: 15-Nov-2017 01:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>10.4</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>0.812</b> | ug/L  | J, D  |



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**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 11:50  
Analyzed: 13-Nov-2017 15:03

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295  
Prepared: 10-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 11:50  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 20 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>2830</b> | mg/L  |       |



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Reported:  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 11:50  
Analyzed: 03-Nov-2017 14:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.789</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | H, U  |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>1.16</b> | mg-P/L | H, D  |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>1.42</b> | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 11:50  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 867    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 867    | mg/L CaCO3 |       |





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**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 11:50  
Analyzed: 17-Nov-2017 13:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>21.8</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 11:50  
Analyzed: 15-Nov-2017 16:56

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Manganese, Dissolved | 7439-96-5  | 20       | 0.0068          | 0.0200          | <b>0.468</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 11:50  
Analyzed: 10-Nov-2017 15:10

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>5.01</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4G2-2-110117-(20)**  
**17K0014-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 11:50  
Analyzed: 10-Nov-2017 23:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1230</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-4H3-1-110117**  
**17K0014-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/01/2017 12:35  
Analyzed: 06-Nov-2017 19:00

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 1 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 115   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 89.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.2  | %     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117**  
**17K0014-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 12:35  
Analyzed: 16-Nov-2017 17:16

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 5 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 1.70            | 2.50            | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117**  
**17K0014-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 12:35  
Analyzed: 15-Nov-2017 20:03

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 5 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.550           | 5.00            | <b>456</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 8.50            | 12.5            | <b>10.3</b> | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 5        | 1.25            | 12.5            | <b>138</b>  | ug/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117**  
**17K0014-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 12:35  
Analyzed: 16-Nov-2017 16:33

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0410 Sample Size: 2 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.00100         | ND     | mg/L  | U     |





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Olympia WA, 98503

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Reported:  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 12:35  
Analyzed: 15-Nov-2017 15:29

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 200      | 1.70            | 10.0            | <b>39.8</b>  | mg/L  | D     |
| Calcium, Dissolved   | 7440-70-2  | 200      | 1.02            | 10.0            | <b>7.89</b>  | mg/L  | J, D  |
| Iron, Dissolved      | 7439-89-6  | 200      | 0.260           | 10.0            | <b>2.53</b>  | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 200      | 3.20            | 10.0            | ND           | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 200      | 10.4            | 100             | <b>158</b>   | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 200      | 1.04            | 12.0            | <b>13800</b> | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 200      | 380             | 10000           | <b>10900</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 12:35  
Analyzed: 16-Nov-2017 17:11

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 5 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 1.70            | 2.50            | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 12:35  
Analyzed: 15-Nov-2017 19:58

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 5 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.550           | 5.00            | <b>516</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 8.50            | 12.5            | <b>16.5</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 1.25            | 12.5            | <b>135</b>  | ug/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 12:35  
Analyzed: 16-Nov-2017 16:16

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0409 Sample Size: 2 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.00100         | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 12:35  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>46800</b> | mg/L  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 12:35  
Analyzed: 03-Nov-2017 12:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | 11.7   | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | 31.4   | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | 33.9   | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 12:35  
Analyzed: 15-Nov-2017 17:19

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Manganese, Dissolved | 7439-96-5  | 200      | 0.0680          | 0.200           | <b>0.132</b> | mg/L  | J, D  |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 12:35  
Analyzed: 10-Nov-2017 15:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>5.79</b> | mg/L  | D     |





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**Reported:**  
10-Jan-2018 14:05

**GW-4H3-1-110117- (20)**  
**17K0014-18RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 12:35  
Analyzed: 10-Nov-2017 23:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1190</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-5I2-1-110117**  
**17K0014-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/01/2017 13:15  
Analyzed: 06-Nov-2017 19:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0146 Sample Size: 1 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.57            | 2.00            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.27            | 2.00            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.49            | 2.00            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.47            | 2.00            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 118   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 93.3  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 88.5  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 107   | %     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117**  
**17K0014-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 13:15  
Analyzed: 16-Nov-2017 17:06

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 5 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Lead    | 7439-92-1  | 10       | 3.40            | 5.00            | <b>7.95</b> | ug/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117**  
**17K0014-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 13:15  
Analyzed: 15-Nov-2017 19:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 5 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 10       | 1.10            | 10.0            | <b>153</b>  | ug/L  | D     |
| Copper  | 7440-50-8  | 10       | 17.0            | 25.0            | <b>46.0</b> | ug/L  | D     |
| Nickel  | 7440-02-0  | 10       | 2.50            | 25.0            | <b>115</b>  | ug/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117**  
**17K0014-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 13:15  
Analyzed: 16-Nov-2017 16:42

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0410 Sample Size: 2 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.00100         | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 13:15  
Analyzed: 15-Nov-2017 15:36

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 100      | 0.850           | 5.00            | <b>4.48</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 100      | 0.510           | 5.00            | <b>6.76</b> | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 100      | 0.130           | 5.00            | <b>2.47</b> | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 100      | 1.60            | 5.00            | ND          | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 100      | 5.20            | 50.0            | <b>141</b>  | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 100      | 0.520           | 6.00            | <b>5780</b> | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 100      | 190             | 5000            | <b>6910</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 13:15  
Analyzed: 16-Nov-2017 17:01

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 5 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 10       | 3.40            | 5.00            | 7.75   | ug/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 13:15  
Analyzed: 15-Nov-2017 19:48

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 5 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 1.10            | 10.0            | <b>139</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 10       | 17.0            | 25.0            | <b>43.1</b> | ug/L  | D     |
| Nickel, Dissolved  | 7440-02-0  | 10       | 2.50            | 25.0            | <b>113</b>  | ug/L  | D     |





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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 13:15  
Analyzed: 13-Nov-2017 15:04

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295  
Prepared: 10-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 13:15  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>24100</b> | mg/L  |       |



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Reported:  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 13:15  
Analyzed: 03-Nov-2017 12:40

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 50       | 5.00            | 6.98   | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 50       | 5.00            | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 50       | 5.00            | 37.5   | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 5.00            | 41.3   | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 13:15  
Analyzed: 17-Nov-2017 13:31

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 50       | 25.0            | <b>897</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 13:15  
Analyzed: 15-Nov-2017 17:13

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Manganese, Dissolved | 7439-96-5  | 100      | 0.0340          | 0.100           | <b>0.0548</b> | mg/L  | J, D  |



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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 13:15  
Analyzed: 10-Nov-2017 15:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5I2-1-110117- (20)**  
**17K0014-20RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 13:15  
Analyzed: 11-Nov-2017 00:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | 732    | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-4H4-2-110117**  
**17K0014-21 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/01/2017 13:50  
Analyzed: 06-Nov-2017 16:22

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0136 Sample Size: 2 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 101   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 88.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.6  | %     |





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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117**  
**17K0014-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 13:50  
Analyzed: 16-Nov-2017 19:20

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117**  
**17K0014-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 13:50  
Analyzed: 15-Nov-2017 18:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>19.3</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>1.31</b> | ug/L  | J, D  |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117**  
**17K0014-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 13:50  
Analyzed: 13-Nov-2017 14:17

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 13:50  
Analyzed: 15-Nov-2017 15:04

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 2        | 0.0170          | 0.100           | <b>0.0196</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 2        | 0.0102          | 0.100           | <b>81.6</b>   | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>0.0942</b> | mg/L  | J, D  |
| Magnesium, Dissolved | 7439-95-4  | 2        | 0.0320          | 0.100           | <b>258</b>    | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 2        | 0.104           | 1.00            | <b>162</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 2        | 0.0104          | 0.120           | <b>20.5</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 2        | 3.80            | 100             | <b>2860</b>   | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 13:50  
Analyzed: 15-Nov-2017 01:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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Reported:  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 13:50  
Analyzed: 15-Nov-2017 01:04

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>19.1</b>  | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | <b>0.835</b> | ug/L  | J, D  |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 13:50  
Analyzed: 13-Nov-2017 15:06

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 13:50  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>8040</b> | mg/L  |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 13:50  
Analyzed: 03-Nov-2017 13:00

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.823</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>1.39</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>8.38</b> | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 13:50  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>2080</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>2080</b> | mg/L CaCO3 |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 13:50  
Analyzed: 15-Nov-2017 16:45

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>0.0655</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 13:50  
Analyzed: 10-Nov-2017 16:12

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>18.6</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22RE1 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 13:50  
Analyzed: 17-Nov-2017 18:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|-------------------------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 5        | 2.50            | <b>103</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-4H4-2-110117-(20)**  
**17K0014-22RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 13:50  
Analyzed: 11-Nov-2017 00:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>3980</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**GW-5D1-3-110117**  
**17K0014-23 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/01/2017 15:00  
Analyzed: 06-Nov-2017 16:50

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0136 Sample Size: 2 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 105 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.9 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 91.2 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.9 % |       |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117**  
**17K0014-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 15:00  
Analyzed: 16-Nov-2017 19:15

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |





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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117**  
**17K0014-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 15:00  
Analyzed: 15-Nov-2017 18:45

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 20       | 0.440           | 4.00            | <b>19.7</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117**  
**17K0014-23 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 15:00  
Analyzed: 13-Nov-2017 14:19

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 15:00  
Analyzed: 15-Nov-2017 15:10

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416 Sample Size: 25 mL  
Prepared: 15-Nov-2017 Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 5        | 0.0425          | 0.250           | <b>0.0583</b> | mg/L  | J, D  |
| Calcium, Dissolved   | 7440-70-2  | 5        | 0.0255          | 0.250           | <b>215</b>    | mg/L  | D     |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>10.7</b>   | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 5        | 0.0800          | 0.250           | <b>469</b>    | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 5        | 0.260           | 2.50            | <b>259</b>    | mg/L  | D     |
| Silicon, Dissolved   | 7440-21-3  | 5        | 0.0260          | 0.300           | <b>19.7</b>   | mg/L  | D     |
| Sodium, Dissolved    | 7440-23-5  | 5        | 9.50            | 250             | <b>6380</b>   | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 15:00  
Analyzed: 15-Nov-2017 00:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 20       | 1.36            | 2.00            | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 15:00  
Analyzed: 15-Nov-2017 00:49

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>16.7</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 20       | 6.80            | 10.0            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 20       | 1.00            | 10.0            | ND          | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 15:00  
Analyzed: 13-Nov-2017 15:07

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295  
Prepared: 10-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 15:00  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>17600</b> | mg/L  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 15:00  
Analyzed: 03-Nov-2017 13:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.999</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>2.22</b> | mg-P/L | D     |





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Reported:  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 15:00  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>1540</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result      | Units      | Notes |
|-------------------|------------|----------|-----------------|-------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>1540</b> | mg/L CaCO3 |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 15:00  
Analyzed: 17-Nov-2017 14:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>22.3</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 15:00  
Analyzed: 15-Nov-2017 17:08

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Manganese, Dissolved | 7439-96-5  | 50       | 0.0170          | 0.0500          | <b>0.652</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 15:00  
Analyzed: 10-Nov-2017 16:32

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>13.4</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 15:00  
Analyzed: 10-Nov-2017 20:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | 443    | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-5D1-3-110117- (20)**  
**17K0014-24RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 15:00  
Analyzed: 11-Nov-2017 00:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 4000     | 400             | <b>10300</b> | mg/L  | D     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**GW-6E7-3-110117**  
**17K0014-25 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/01/2017 15:05  
Analyzed: 06-Nov-2017 17:17

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0136 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 104   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 87.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.3  | %     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117**  
**17K0014-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 15:05  
Analyzed: 16-Nov-2017 19:40

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |





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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117**  
**17K0014-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 15:05  
Analyzed: 15-Nov-2017 19:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>273</b>   | ug/L  | D     |
| Copper  | 7440-50-8  | 2        | 0.680           | 1.00            | <b>0.928</b> | ug/L  | J, D  |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>0.352</b> | ug/L  | J, D  |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117**  
**17K0014-25 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 15:05  
Analyzed: 13-Nov-2017 14:21

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 15:05  
Analyzed: 15-Nov-2017 14:58

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>61.1</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.414</b> | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>106</b>   | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>50.9</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>24.7</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>550</b>   | mg/L  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 15:05  
Analyzed: 15-Nov-2017 01:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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Reported:  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 15:05  
Analyzed: 15-Nov-2017 01:13

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>229</b>   | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>0.282</b> | ug/L  | J, D  |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 15:05  
Analyzed: 13-Nov-2017 15:09

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 15:05  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 50 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1950</b> | mg/L  |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 15:05  
Analyzed: 03-Nov-2017 13:41

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.63</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>1.88</b> | mg/L  | D     |





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Reported:  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 15:05  
Analyzed: 06-Nov-2017 11:52

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 391    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 391    | mg/L CaCO3 |       |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 15:05  
Analyzed: 17-Nov-2017 14:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>4.06</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26RE1 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 15:05  
Analyzed: 15-Nov-2017 16:39

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.0334</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 15:05  
Analyzed: 10-Nov-2017 16:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>3.41</b> | mg/L  | D     |



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**Reported:**  
10-Jan-2018 14:05

**GW-6E7-3-110117- (20)**  
**17K0014-26RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 15:05  
Analyzed: 11-Nov-2017 01:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1010</b> | mg/L  | D     |



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Reported:  
10-Jan-2018 14:05

**EB-110117**  
**17K0014-27 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/01/2017 14:30  
Analyzed: 06-Nov-2017 17:43

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0136 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.12</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 105 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.1 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 86.8 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 104 %  |       |



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**Reported:**  
10-Jan-2018 14:05

**EB-110117**  
**17K0014-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 14:30  
Analyzed: 16-Nov-2017 18:40

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
10-Jan-2018 14:05

**EB-110117**  
**17K0014-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 14:30  
Analyzed: 15-Nov-2017 18:12

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0362 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.0820</b> | ug/L  | J     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND            | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.109</b>  | ug/L  | J     |





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**Reported:**  
10-Jan-2018 14:05

**EB-110117**  
**17K0014-27 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 14:30  
Analyzed: 13-Nov-2017 14:22

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0293 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**EB-110117- (20)**  
**17K0014-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/01/2017 14:30  
Analyzed: 15-Nov-2017 13:05

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0416  
Prepared: 15-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | ND            | mg/L  | U     |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0021</b> | mg/L  | J     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | ND            | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | ND            | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | ND            | mg/L  | U     |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | ND            | mg/L  | U     |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | <b>0.0829</b> | mg/L  | J     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**EB-110117- (20)**

**17K0014-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/01/2017 14:30  
Analyzed: 15-Nov-2017 00:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
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**Reported:**  
10-Jan-2018 14:05

**EB-110117- (20)**  
**17K0014-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/01/2017 14:30  
Analyzed: 15-Nov-2017 00:08

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0363 Sample Size: 25 mL  
Prepared: 14-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | ND     | ug/L  | U     |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND     | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**EB-110117- (20)**  
**17K0014-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/01/2017 14:30  
Analyzed: 13-Nov-2017 15:11

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0295 Sample Size: 20 mL  
Prepared: 10-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**EB-110117- (20)**

**17K0014-28 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/01/2017 14:30  
Analyzed: 03-Nov-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0082 Sample Size: 200 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Solids |            | 1        | 5.0             | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**EB-110117- (20)**

**17K0014-28 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 14:30  
Analyzed: 03-Nov-2017 14:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035  
Prepared: 01-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**EB-110117- (20)**

**17K0014-28 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/01/2017 14:30  
Analyzed: 06-Nov-2017 16:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0144 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |





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**Reported:**  
10-Jan-2018 14:05

**EB-110117- (20)**

**17K0014-28 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/01/2017 14:30  
Analyzed: 17-Nov-2017 15:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | ND     | mg/L  | U     |



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**Reported:**  
10-Jan-2018 14:05

**EB-110117- (20)**  
**17K0014-28RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/01/2017 14:30  
Analyzed: 10-Nov-2017 17:11

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0035 Sample Size: 5 mL  
Prepared: 01-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |



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Reported:  
10-Jan-2018 14:05

**TB**  
**17K0014-29 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 10/31/2017 00:00  
Analyzed: 06-Nov-2017 18:09

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0136 Sample Size: 10 mL  
Prepared: 06-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 99.3 % |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 86.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102 %  |       |



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Reported:  
10-Jan-2018 14:05

### Volatile Organic Compounds - Quality Control

#### Batch BFK0136 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0136-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 10:45 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.6 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.85   |                 |                 | ug/L  | 5.00        |   | 97.1 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.49   |                 |                 | ug/L  | 5.00        |   | 89.8 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.09   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFK0136-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 08:38 |      |             |      |           |       |
| Vinyl Chloride                    | 12.4   | 0.06            | 0.20            | ug/L  | 10.0        |   | 124  | 66-133      |      |           | Q     |
| Chloroform                        | 9.21   | 0.03            | 0.20            | ug/L  | 10.0        |   | 92.1 | 80-122      |      |           |       |
| Trichloroethene                   | 9.65   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.5 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.53   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.3 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.67   |                 |                 | ug/L  | 5.00        |   | 93.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.82   |                 |                 | ug/L  | 5.00        |   | 96.5 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.83   |                 |                 | ug/L  | 5.00        |   | 96.6 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.52   |                 |                 | ug/L  | 5.00        |   | 90.5 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.93   |                 |                 | ug/L  | 5.00        |   | 98.6 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0136-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 09:04 |      |             |      |           |       |
| Vinyl Chloride                    | 12.6   | 0.06            | 0.20            | ug/L  | 10.0        |   | 126  | 66-133      | 1.84 | 30        | Q     |
| Chloroform                        | 9.31   | 0.03            | 0.20            | ug/L  | 10.0        |   | 93.1 | 80-122      | 1.12 | 30        |       |
| Trichloroethene                   | 9.19   | 0.05            | 0.20            | ug/L  | 10.0        |   | 91.9 | 80-120      | 4.88 | 30        |       |
| Tetrachloroethene                 | 9.53   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.3 | 80-120      | 0.01 | 30        |       |
| Surrogate: Dibromofluoromethane   | 4.61   |                 |                 | ug/L  | 5.00        |   | 92.1 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.91   |                 |                 | ug/L  | 5.00        |   | 98.3 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.89   |                 |                 | ug/L  | 5.00        |   | 97.8 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.62   |                 |                 | ug/L  | 5.00        |   | 92.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.96   |                 |                 | ug/L  | 5.00        |   | 99.1 | 80-120      |      |           |       |



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Reported:  
10-Jan-2018 14:05

**Volatile Organic Compounds - Quality Control**

**Batch BFK0146 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|--------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0146-BLK1)</b>       |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 12:29 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20               | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 5.14   |                 |                    | ug/L  | 5.00        |   | 103  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.68   |                 |                    | ug/L  | 5.00        |   | 93.7 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.38   |                 |                    | ug/L  | 5.00        |   | 87.6 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.13   |                 |                    | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| <b>LCS (BFK0146-BS1)</b>          |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 11:06 |      |             |      |           |       |
| Vinyl Chloride                    | 9.61   | 0.06            | 0.20               | ug/L  | 10.0        |   | 96.1 | 66-133      |      |           |       |
| Chloroform                        | 9.62   | 0.03            | 0.20               | ug/L  | 10.0        |   | 96.2 | 80-122      |      |           |       |
| Trichloroethene                   | 9.56   | 0.05            | 0.20               | ug/L  | 10.0        |   | 95.6 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.86   | 0.05            | 0.20               | ug/L  | 10.0        |   | 98.6 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.81   |                 |                    | ug/L  | 5.00        |   | 96.2 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.55   |                 |                    | ug/L  | 5.00        |   | 91.0 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.10   |                 |                    | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.88   |                 |                    | ug/L  | 5.00        |   | 97.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.03   |                 |                    | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFK0146-BSD1)</b>     |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 |                    |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 11:26 |      |             |      |           |       |
| Vinyl Chloride                    | 9.91   | 0.06            | 0.20               | ug/L  | 10.0        |   | 99.1 | 66-133      | 3.05 | 30        |       |
| Chloroform                        | 10.1   | 0.03            | 0.20               | ug/L  | 10.0        |   | 101  | 80-122      | 4.74 | 30        |       |
| Trichloroethene                   | 9.93   | 0.05            | 0.20               | ug/L  | 10.0        |   | 99.3 | 80-120      | 3.77 | 30        |       |
| Tetrachloroethene                 | 10.2   | 0.05            | 0.20               | ug/L  | 10.0        |   | 102  | 80-120      | 2.88 | 30        |       |
| Surrogate: Dibromofluoromethane   | 4.90   |                 |                    | ug/L  | 5.00        |   | 98.0 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.63   |                 |                    | ug/L  | 5.00        |   | 92.7 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.05   |                 |                    | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 5.02   |                 |                    | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.99   |                 |                    | ug/L  | 5.00        |   | 99.8 | 80-120      |      |           |       |
| <b>Matrix Spike (BFK0146-MS1)</b> |        |                 |                    |       |             |   |      |             |      |           |       |
|                                   |        |                 | Source: 17K0014-07 |       |             | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 19:43 |      |             |      |           |       |
| Vinyl Chloride                    | 9.25   | 0.06            | 0.20               | ug/L  | 10.0        | ND  | 92.5 | 66-133      |      |           |       |
| Chloroform                        | 10.3   | 0.03            | 0.20               | ug/L  | 10.0        | ND  | 103  | 80-122      |      |           |       |



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Reported:  
10-Jan-2018 14:05

### Volatile Organic Compounds - Quality Control

#### Batch BFK0146 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit           | Reporting Limit | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|-----------------|-------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFK0146-MS1)</b> |        | <b>Source: 17K0014-07</b> |                 |       | Prepared: 06-Nov-2017 |               | Analyzed: 06-Nov-2017 19:43 |             |     |           |       |
| Trichloroethene                   | 9.60   | 0.05                      | 0.20            | ug/L  | 10.0                  | ND            | 96.0                        | 80-120      |     |           |       |
| Tetrachloroethene                 | 9.51   | 0.05                      | 0.20            | ug/L  | 10.0                  | ND            | 95.1                        | 80-120      |     |           |       |
| Surrogate: Dibromofluoromethane   | 5.16   |                           |                 | ug/L  | 5.00                  |               | 103                         | 80-120      |     |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 5.03   |                           |                 | ug/L  | 5.00                  | 5.93          | 101                         | 80-129      |     |           |       |
| Surrogate: Toluene-d8             | 5.16   |                           |                 | ug/L  | 5.00                  | 4.67          | 103                         | 80-120      |     |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.85   |                           |                 | ug/L  | 5.00                  | 4.19          | 97.1                        | 80-120      |     |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.88   |                           |                 | ug/L  | 5.00                  | 5.26          | 97.6                        | 80-120      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                           |      |      |                       |      |                             |        |  |  |  |
|-----------------------------------|------|---------------------------|------|------|-----------------------|------|-----------------------------|--------|--|--|--|
| <b>Matrix Spike (BFK0146-MS2)</b> |      | <b>Source: 17K0014-09</b> |      |      | Prepared: 06-Nov-2017 |      | Analyzed: 06-Nov-2017 20:24 |        |  |  |  |
| Vinyl Chloride                    | 10.8 | 0.06                      | 0.20 | ug/L | 10.0                  | ND   | 108                         | 66-133 |  |  |  |
| Chloroform                        | 10.5 | 0.03                      | 0.20 | ug/L | 10.0                  | ND   | 105                         | 80-122 |  |  |  |
| Trichloroethene                   | 9.82 | 0.05                      | 0.20 | ug/L | 10.0                  | ND   | 98.2                        | 80-120 |  |  |  |
| Tetrachloroethene                 | 9.83 | 0.05                      | 0.20 | ug/L | 10.0                  | ND   | 98.3                        | 80-120 |  |  |  |
| Surrogate: Dibromofluoromethane   | 5.18 |                           |      | ug/L | 5.00                  |      | 104                         | 80-120 |  |  |  |
| Surrogate: 1,2-Dichloroethane-d4  | 5.10 |                           |      | ug/L | 5.00                  | 5.98 | 102                         | 80-129 |  |  |  |
| Surrogate: Toluene-d8             | 5.02 |                           |      | ug/L | 5.00                  | 4.84 | 100                         | 80-120 |  |  |  |
| Surrogate: 4-Bromofluorobenzene   | 5.01 |                           |      | ug/L | 5.00                  | 4.24 | 100                         | 80-120 |  |  |  |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.95 |                           |      | ug/L | 5.00                  | 5.13 | 99.0                        | 80-120 |  |  |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|  |      |                           |      |      |                       |      |                             |        |      |    |  |
|--|------|---------------------------|------|------|-----------------------|------|-----------------------------|--------|------|----|--|
| <b>Matrix Spike Dup (BFK0146-MSD1)</b> |      | <b>Source: 17K0014-07</b> |      |      | Prepared: 06-Nov-2017 |      | Analyzed: 06-Nov-2017 20:04 |        |      |    |  |
| Vinyl Chloride                         | 10.2 | 0.06                      | 0.20 | ug/L | 10.0                  | ND   | 102                         | 66-133 | 9.63 | 30 |  |
| Chloroform                             | 10.4 | 0.03                      | 0.20 | ug/L | 10.0                  | ND   | 104                         | 80-122 | 1.01 | 30 |  |
| Trichloroethene                        | 9.90 | 0.05                      | 0.20 | ug/L | 10.0                  | ND   | 99.0                        | 80-120 | 3.04 | 30 |  |
| Tetrachloroethene                      | 9.83 | 0.05                      | 0.20 | ug/L | 10.0                  | ND   | 98.3                        | 80-120 | 3.31 | 30 |  |
| Surrogate: Dibromofluoromethane        | 5.08 |                           |      | ug/L | 5.00                  |      | 102                         | 80-120 |      |    |  |
| Surrogate: 1,2-Dichloroethane-d4       | 4.92 |                           |      | ug/L | 5.00                  | 5.93 | 98.4                        | 80-129 |      |    |  |
| Surrogate: Toluene-d8                  | 5.06 |                           |      | ug/L | 5.00                  | 4.67 | 101                         | 80-120 |      |    |  |
| Surrogate: 4-Bromofluorobenzene        | 4.89 |                           |      | ug/L | 5.00                  | 4.19 | 97.9                        | 80-120 |      |    |  |
| Surrogate: 1,2-Dichlorobenzene-d4      | 5.00 |                           |      | ug/L | 5.00                  | 5.26 | 99.9                        | 80-120 |      |    |  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|  |  |                           |  |  |                       |  |                             |  |  |  |  |
|--|--|---------------------------|--|--|-----------------------|--|-----------------------------|--|--|--|--|
| <b>Matrix Spike Dup (BFK0146-MSD2)</b> |  | <b>Source: 17K0014-09</b> |  |  | Prepared: 06-Nov-2017 |  | Analyzed: 06-Nov-2017 20:45 |  |  |  |  |
|--|--|---------------------------|--|--|-----------------------|--|-----------------------------|--|--|--|--|



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

### Volatile Organic Compounds - Quality Control

#### Batch BFK0146 - EPA 5030 (Purge and Trap)

Instrument: NT2 Analyst: PC

| QC Sample/Analyte                      | Result | Detection Limit           | Reporting Limit | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD  | RPD Limit | Notes |
|--|--------|---------------------------|-----------------|-------|-----------------------|---------------|-----------------------------|-------------|------|-----------|-------|
| <b>Matrix Spike Dup (BFK0146-MSD2)</b> |        |                           |                 |       |                       |               |                             |             |      |           |       |
|  |        | <b>Source: 17K0014-09</b> |                 |       | Prepared: 06-Nov-2017 |               | Analyzed: 06-Nov-2017 20:45 |             |      |           |       |
| Vinyl Chloride                         | 10.8   | 0.06                      | 0.20            | ug/L  | 10.0                  | ND            | 108                         | 66-133      | 0.01 | 30        |       |
| Chloroform                             | 10.5   | 0.03                      | 0.20            | ug/L  | 10.0                  | ND            | 105                         | 80-122      | 0.03 | 30        |       |
| Trichloroethene                        | 10.0   | 0.05                      | 0.20            | ug/L  | 10.0                  | ND            | 100                         | 80-120      | 1.76 | 30        |       |
| Tetrachloroethene                      | 9.83   | 0.05                      | 0.20            | ug/L  | 10.0                  | ND            | 98.3                        | 80-120      | 0.01 | 30        |       |
| Surrogate: Dibromofluoromethane        | 5.15   |                           |                 | ug/L  | 5.00                  |               | 103                         | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4       | 4.95   |                           |                 | ug/L  | 5.00                  | 5.98          | 99.0                        | 80-129      |      |           |       |
| Surrogate: Toluene-d8                  | 5.11   |                           |                 | ug/L  | 5.00                  | 4.84          | 102                         | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene        | 4.77   |                           |                 | ug/L  | 5.00                  | 4.24          | 95.4                        | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4      | 4.85   |                           |                 | ug/L  | 5.00                  | 5.13          | 97.1                        | 80-120      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0293 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte   | Result  | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---------|---|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0293-BLK1)</b>   |         | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 13:48 |       |   |               |      |             |     |           |       |
| Mercury   | ND      | 0.000100  | mg/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0293-BS1)</b>  |         | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 15:22 |       |   |               |      |             |     |           |       |
| Mercury   | 0.00235 | 0.000100  | mg/L  | 0.00200   |               | 118  | 80-120      |     |           |       |
| <b>Duplicate (BFK0293-DUP1)</b>   |         | <b>Source: 17K0014-07</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:00 |               |      |             |     |           |       |
| Mercury   | ND      | 0.000100  | mg/L  |   | ND            |      |             |     |           | U     |
| <b>Duplicate (BFK0293-DUP2)</b>   |         | <b>Source: 17K0014-09</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:05 |               |      |             |     |           |       |
| Mercury   | ND      | 0.000100  | mg/L  |   | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BFK0293-MS1)</b>   |         | <b>Source: 17K0014-07</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:02 |               |      |             |     |           |       |
| Mercury   | 0.00134 | 0.000100  | mg/L  | 0.00100   | ND            | 134  | 75-125      |     |           | *     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |   |       |   |               |      |             |     |           |       |
| <b>Matrix Spike (BFK0293-MS2)</b>   |         | <b>Source: 17K0014-09</b>                         |       | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:07 |               |      |             |     |           |       |
| Mercury   | 0.00112 | 0.000100  | mg/L  | 0.00100   | ND            | 112  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0362 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFK0362-BLK1)</b>       |         |        |                 |                 |       | Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 17:41                    |               |      |             |       |           |       |
| Arsenic                           | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |       |           | U     |
| Copper                            | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Copper                            | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| <b>Blank (BFK0362-BLK2)</b>       |         |        |                 |                 |       | Prepared: 14-Nov-2017 Analyzed: 16-Nov-2017 18:09                    |               |      |             |       |           |       |
| Lead                              | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |      |             |       |           | U     |
| Nickel                            | 60      | ND     | 0.0500          | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel                            | 62      | ND     | 0.220           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| <b>LCS (BFK0362-BS1)</b>          |         |        |                 |                 |       | Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 18:06                    |               |      |             |       |           |       |
| Arsenic                           | 75a     | 28.8   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 115  | 80-120      |       |           |       |
| Copper                            | 63      | 26.3   | 0.340           | 0.500           | ug/L  | 25.0   |               | 105  | 80-120      |       |           |       |
| Copper                            | 65      | 25.8   | 0.350           | 0.500           | ug/L  | 25.0   |               | 103  | 80-120      |       |           |       |
| <b>LCS (BFK0362-BS2)</b>          |         |        |                 |                 |       | Prepared: 14-Nov-2017 Analyzed: 16-Nov-2017 18:34                    |               |      |             |       |           |       |
| Lead                              | 208     | 27.4   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 110  | 80-120      |       |           |       |
| Nickel                            | 60      | 26.4   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 105  | 80-120      |       |           |       |
| Nickel                            | 62      | 26.5   | 0.220           | 0.500           | ug/L  | 25.0   |               | 106  | 80-120      |       |           |       |
| <b>Duplicate (BFK0362-DUP1)</b>   |         |        |                 |                 |       | Source: 17K0014-09 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 17:46 |               |      |             |       |           |       |
| Arsenic                           | 75a     | 46.5   | 0.0220          | 0.200           | ug/L  |  | 46.8          |      |             | 0.50  | 20        |       |
| Copper                            | 63      | 7.64   | 0.340           | 0.500           | ug/L  |  | 7.38          |      |             | 3.40  | 20        |       |
| <b>Duplicate (BFK0362-DUP2)</b>   |         |        |                 |                 |       | Source: 17K0014-07 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 18:17 |               |      |             |       |           |       |
| Arsenic                           | 75a     | 0.613  | 0.0220          | 0.200           | ug/L  |  | 0.577         |      |             | 6.05  | 20        |       |
| Copper                            | 63      | 0.722  | 0.340           | 0.500           | ug/L  |  | ND            |      |             |       |           |       |
| <b>Duplicate (BFK0362-DUP3)</b>   |         |        |                 |                 |       | Source: 17K0014-09 Prepared: 14-Nov-2017 Analyzed: 16-Nov-2017 18:14 |               |      |             |       |           |       |
| Lead                              | 208     | 0.941  | 0.0680          | 0.100           | ug/L  |  | 0.940         |      |             | 0.11  | 20        |       |
| Nickel                            | 60      | 4.67   | 0.0500          | 0.500           | ug/L  |  | 4.86          |      |             | 3.96  | 20        |       |
| <b>Duplicate (BFK0362-DUP4)</b>   |         |        |                 |                 |       | Source: 17K0014-07 Prepared: 14-Nov-2017 Analyzed: 16-Nov-2017 18:46 |               |      |             |       |           |       |
| Lead                              | 208     | 0.0870 | 0.0680          | 0.100           | ug/L  |  | ND            |      |             |       |           | J     |
| Nickel                            | 60      | 0.249  | 0.0500          | 0.500           | ug/L  |  | 0.200         |      |             | 21.80 | 20        | J     |
| <b>Matrix Spike (BFK0362-MS1)</b> |         |        |                 |                 |       | Source: 17K0014-09 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 17:55 |               |      |             |       |           |       |
| Arsenic                           | 75a     | 73.5   | 0.0220          | 0.200           | ug/L  | 25.0   | 46.8          | 107  | 75-125      |       |           |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

### Metals and Metallic Compounds - Quality Control

#### Batch BFK0362 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|---------|--------|-----------------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|---------|--------|-----------------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**Matrix Spike (BFK0362-MS1)** Source: 17K0014-09 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 17:55

|        |    |      |       |       |      |      |      |      |        |  |  |  |
|--------|----|------|-------|-------|------|------|------|------|--------|--|--|--|
| Copper | 63 | 32.0 | 0.340 | 0.500 | ug/L | 25.0 | 7.38 | 98.5 | 75-125 |  |  |  |
|--------|----|------|-------|-------|------|------|------|------|--------|--|--|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFK0362-MS2)** Source: 17K0014-09 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 18:27

|         |     |      |        |       |      |      |      |    |        |  |  |  |
|---------|-----|------|--------|-------|------|------|------|----|--------|--|--|--|
| Arsenic | 75a | 27.6 | 0.0220 | 0.200 | ug/L | 25.0 | 46.8 | NR | 75-125 |  |  |  |
|---------|-----|------|--------|-------|------|------|------|----|--------|--|--|--|

|        |    |      |       |       |      |      |      |      |        |  |  |  |
|--------|----|------|-------|-------|------|------|------|------|--------|--|--|--|
| Copper | 63 | 24.2 | 0.340 | 0.500 | ug/L | 25.0 | 7.38 | 67.3 | 75-125 |  |  |  |
|--------|----|------|-------|-------|------|------|------|------|--------|--|--|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFK0362-MS3)** Source: 17K0014-09 Prepared: 14-Nov-2017 Analyzed: 16-Nov-2017 18:23

|      |     |      |        |       |      |      |       |     |        |  |  |  |
|------|-----|------|--------|-------|------|------|-------|-----|--------|--|--|--|
| Lead | 208 | 26.5 | 0.0680 | 0.100 | ug/L | 25.0 | 0.940 | 102 | 75-125 |  |  |  |
|------|-----|------|--------|-------|------|------|-------|-----|--------|--|--|--|

|        |    |      |        |       |      |      |      |     |        |  |  |  |
|--------|----|------|--------|-------|------|------|------|-----|--------|--|--|--|
| Nickel | 60 | 30.5 | 0.0500 | 0.500 | ug/L | 25.0 | 4.86 | 103 | 75-125 |  |  |  |
|--------|----|------|--------|-------|------|------|------|-----|--------|--|--|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike (BFK0362-MS4)** Source: 17K0014-07 Prepared: 14-Nov-2017 Analyzed: 16-Nov-2017 18:56

|      |     |      |        |       |      |      |    |      |        |  |  |  |
|------|-----|------|--------|-------|------|------|----|------|--------|--|--|--|
| Lead | 208 | 23.5 | 0.0680 | 0.100 | ug/L | 25.0 | ND | 94.0 | 75-125 |  |  |  |
|------|-----|------|--------|-------|------|------|----|------|--------|--|--|--|

|        |    |      |        |       |      |      |       |     |        |  |  |  |
|--------|----|------|--------|-------|------|------|-------|-----|--------|--|--|--|
| Nickel | 60 | 25.4 | 0.0500 | 0.500 | ug/L | 25.0 | 0.200 | 101 | 75-125 |  |  |  |
|--------|----|------|--------|-------|------|------|-------|-----|--------|--|--|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike Dup (BFK0362-MSD1)** Source: 17K0014-09 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 18:00

|         |     |      |        |       |      |      |      |      |        |      |    |  |
|---------|-----|------|--------|-------|------|------|------|------|--------|------|----|--|
| Arsenic | 75a | 71.4 | 0.0220 | 0.200 | ug/L | 25.0 | 46.8 | 98.4 | 75-125 | 2.92 | 20 |  |
|---------|-----|------|--------|-------|------|------|------|------|--------|------|----|--|

|        |    |      |       |       |      |      |      |      |        |      |    |  |
|--------|----|------|-------|-------|------|------|------|------|--------|------|----|--|
| Copper | 63 | 31.4 | 0.340 | 0.500 | ug/L | 25.0 | 7.38 | 96.2 | 75-125 | 1.77 | 20 |  |
|--------|----|------|-------|-------|------|------|------|------|--------|------|----|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

**Matrix Spike Dup (BFK0362-MSD2)** Source: 17K0014-09 Prepared: 14-Nov-2017 Analyzed: 16-Nov-2017 18:28

|      |     |      |        |       |      |      |       |      |        |       |    |  |
|------|-----|------|--------|-------|------|------|-------|------|--------|-------|----|--|
| Lead | 208 | 25.4 | 0.0680 | 0.100 | ug/L | 25.0 | 0.940 | 97.9 | 75-125 | 11.00 | 20 |  |
|------|-----|------|--------|-------|------|------|-------|------|--------|-------|----|--|

|        |    |      |        |       |      |      |      |     |        |       |    |  |
|--------|----|------|--------|-------|------|------|------|-----|--------|-------|----|--|
| Nickel | 60 | 30.1 | 0.0500 | 0.500 | ug/L | 25.0 | 4.86 | 101 | 75-125 | 19.40 | 20 |  |
|--------|----|------|--------|-------|------|------|------|-----|--------|-------|----|--|

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0410 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result  | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0410-BLK1)</b>       |         | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 16:30 |       |   |               |      |             |     |           |       |
| Mercury                           | ND      | 0.000100  | mg/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0410-BS1)</b>          |         | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 16:31 |       |   |               |      |             |     |           |       |
| Mercury                           | 0.00223 | 0.000100  | mg/L  | 0.00200   |               | 112  | 80-120      |     |           |       |
| <b>Duplicate (BFK0410-DUP1)</b>   |         | <b>Source: 17K0014-17</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 16:35 |               |      |             |     |           |       |
| Mercury                           | ND      | 0.00100   | mg/L  |   | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BFK0410-MS1)</b> |         | <b>Source: 17K0014-17</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 16:36 |               |      |             |     |           |       |
| Mercury                           | 0.0107  | 0.00100   | mg/L  | 0.0100  | ND            | 107  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0295 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte   | Result  | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|---------|---------------------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0295-BLK1)</b>   |         |                           |       |             |   |      |             |     |           |       |
|   |         |                           |       |             | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:36 |      |             |     |           |       |
| Mercury, Dissolved  | ND      | 0.000100                  | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0295-BS1)</b>  |         |                           |       |             |   |      |             |     |           |       |
|   |         |                           |       |             | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:38 |      |             |     |           |       |
| Mercury, Dissolved  | 0.00227 | 0.000100                  | mg/L  | 0.00200     |   | 114  | 80-120      |     |           |       |
| <b>Duplicate (BFK0295-DUP1)</b>   |         |                           |       |             |   |      |             |     |           |       |
|   |         | <b>Source: 17K0014-08</b> |       |             | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:47 |      |             |     |           |       |
| Mercury, Dissolved  | ND      | 0.000100                  | mg/L  |             | ND  |      |             |     |           | U     |
| <b>Duplicate (BFK0295-DUP2)</b>   |         |                           |       |             |   |      |             |     |           |       |
|   |         | <b>Source: 17K0014-10</b> |       |             | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:52 |      |             |     |           |       |
| Mercury, Dissolved  | ND      | 0.000100                  | mg/L  |             | ND  |      |             |     |           | U     |
| <b>Matrix Spike (BFK0295-MS1)</b>   |         |                           |       |             |   |      |             |     |           |       |
|   |         | <b>Source: 17K0014-08</b> |       |             | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:48 |      |             |     |           |       |
| Mercury, Dissolved  | 0.00113 | 0.000100                  | mg/L  | 0.00100     | ND  | 113  | 75-125      |     |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |                           |       |             |   |      |             |     |           |       |
| <b>Matrix Spike (BFK0295-MS2)</b>   |         |                           |       |             |   |      |             |     |           |       |
|   |         | <b>Source: 17K0014-10</b> |       |             | Prepared: 10-Nov-2017 Analyzed: 13-Nov-2017 14:53 |      |             |     |           |       |
| Mercury, Dissolved  | 0.00121 | 0.000100                  | mg/L  | 0.00100     | ND  | 120  | 75-125      |     |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |                           |       |             |   |      |             |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0363 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte   | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFK0363-BLK1)</b>   |         |        |                 |                 |       | Prepared: 14-Nov-2017 Analyzed: 14-Nov-2017 22:34                    |               |      |             |       |           |       |
| Lead, Dissolved   | 208     | ND     | 0.0680          | 0.100           | ug/L  |  |               |      |             |       |           | U     |
| Arsenic, Dissolved  | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |       |           | U     |
| Copper, Dissolved   | 63      | ND     | 0.340           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Copper, Dissolved   | 65      | ND     | 0.350           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel, Dissolved   | 60      | ND     | 0.0500          | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| Nickel, Dissolved   | 62      | ND     | 0.220           | 0.500           | ug/L  |  |               |      |             |       |           | U     |
| <b>LCS (BFK0363-BS1)</b>  |         |        |                 |                 |       | Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 00:31                    |               |      |             |       |           |       |
| Lead, Dissolved   | 208     | 30.0   | 0.0680          | 0.100           | ug/L  | 25.0   |               | 120  | 80-120      |       |           |       |
| Arsenic, Dissolved  | 75a     | 27.0   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 108  | 80-120      |       |           |       |
| Copper, Dissolved   | 63      | 25.3   | 0.340           | 0.500           | ug/L  | 25.0   |               | 101  | 80-120      |       |           |       |
| Copper, Dissolved   | 65      | 25.5   | 0.350           | 0.500           | ug/L  | 25.0   |               | 102  | 80-120      |       |           |       |
| Nickel, Dissolved   | 60      | 24.7   | 0.0500          | 0.500           | ug/L  | 25.0   |               | 98.6 | 80-120      |       |           |       |
| Nickel, Dissolved   | 62      | 24.4   | 0.220           | 0.500           | ug/L  | 25.0   |               | 97.7 | 80-120      |       |           |       |
| <b>Duplicate (BFK0363-DUP1)</b>   |         |        |                 |                 |       | Source: 17K0014-08 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 00:14 |               |      |             |       |           |       |
| Lead, Dissolved   | 208     | ND     | 0.0680          | 0.100           | ug/L  |  | ND            |      |             |       |           | U     |
| Arsenic, Dissolved  | 75a     | 0.282  | 0.0220          | 0.200           | ug/L  |  | 0.285         |      |             | 1.06  | 20        |       |
| Copper, Dissolved   | 63      | ND     | 0.340           | 0.500           | ug/L  |  | ND            |      |             |       |           | U     |
| Nickel, Dissolved   | 60      | 0.0980 | 0.0500          | 0.500           | ug/L  |  | 0.107         |      |             | 8.78  | 20        | J     |
| <b>Duplicate (BFK0363-DUP2)</b>   |         |        |                 |                 |       | Source: 17K0014-10 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 01:23 |               |      |             |       |           |       |
| Lead, Dissolved   | 208     | 0.533  | 0.0680          | 0.100           | ug/L  |  | 0.607         |      |             | 13.00 | 20        |       |
| Arsenic, Dissolved  | 75a     | 57.9   | 0.0220          | 0.200           | ug/L  |  | 56.1          |      |             | 3.21  | 20        |       |
| Copper, Dissolved   | 63      | 4.36   | 0.340           | 0.500           | ug/L  |  | 4.38          |      |             | 0.53  | 20        |       |
| Nickel, Dissolved   | 60      | 4.90   | 0.0500          | 0.500           | ug/L  |  | 4.71          |      |             | 3.91  | 20        |       |
| <b>Matrix Spike (BFK0363-MS1)</b>   |         |        |                 |                 |       | Source: 17K0014-08 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 00:24 |               |      |             |       |           |       |
| Lead, Dissolved   | 208     | 27.4   | 0.0680          | 0.100           | ug/L  | 25.0   | ND            | 109  | 75-125      |       |           |       |
| Arsenic, Dissolved  | 75a     | 27.1   | 0.0220          | 0.200           | ug/L  | 25.0   | 0.285         | 107  | 75-125      |       |           |       |
| Copper, Dissolved   | 63      | 24.9   | 0.340           | 0.500           | ug/L  | 25.0   | ND            | 99.4 | 75-125      |       |           |       |
| Nickel, Dissolved   | 60      | 25.7   | 0.0500          | 0.500           | ug/L  | 25.0   | 0.107         | 102  | 75-125      |       |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |         |        |                 |                 |       |  |               |      |             |       |           |       |
| <b>Matrix Spike (BFK0363-MS2)</b>   |         |        |                 |                 |       | Source: 17K0014-10 Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 01:33 |               |      |             |       |           |       |
| Lead, Dissolved   | 208     | 27.2   | 0.0680          | 0.100           | ug/L  | 25.0   | 0.607         | 107  | 75-125      |       |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
10-Jan-2018 14:05

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0363 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte                 | Isotope | Result                    | Detection Limit | Reporting Limit | Units   | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|---------------------------|-----------------|-----------------|---|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFK0363-MS2)</b> |         | <b>Source: 17K0014-10</b> |                 |                 | Prepared: 14-Nov-2017 Analyzed: 15-Nov-2017 01:33 |             |               |      |             |     |           |       |
| Arsenic, Dissolved                | 75a     | 85.2                      | 0.0220          | 0.200           | ug/L  | 25.0        | 56.1          | 116  | 75-125      |     |           |       |
| Copper, Dissolved                 | 63      | 28.0                      | 0.340           | 0.500           | ug/L  | 25.0        | 4.38          | 94.5 | 75-125      |     |           |       |
| Nickel, Dissolved                 | 60      | 28.2                      | 0.0500          | 0.500           | ug/L  | 25.0        | 4.71          | 94.1 | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>10-Jan-2018 14:05 |
|--|--|---------------------------------------|

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0409 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0409-BLK1)</b> |         |                 |       |             | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 16:13 |      |             |     |           |       |
| Mercury, Dissolved          | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0409-BS1)</b>    |         |                 |       |             | Prepared: 15-Nov-2017 Analyzed: 16-Nov-2017 16:15 |      |             |     |           |       |
| Mercury, Dissolved          | 0.00207 | 0.000100        | mg/L  | 0.00200     |   | 104  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0416 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0416-BLK1)</b> |        |                 |                 |       |             | Prepared: 15-Nov-2017 Analyzed: 15-Nov-2017 13:47 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron, Dissolved             | 0.0044 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | 0.0063 | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | 0.0639 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |

|                          |       |        |        |      |       |   |      |        |  |  |   |
|--------------------------|-------|--------|--------|------|-------|---|------|--------|--|--|---|
| <b>LCS (BFK0416-BS1)</b> |       |        |        |      |       | Prepared: 15-Nov-2017 Analyzed: 15-Nov-2017 14:20 |      |        |  |  |   |
| Aluminum, Dissolved      | 2.06  | 0.0085 | 0.0500 | mg/L | 2.00  |   | 103  | 80-120 |  |  |   |
| Calcium, Dissolved       | 9.88  | 0.0051 | 0.0500 | mg/L | 10.0  |   | 98.8 | 80-120 |  |  |   |
| Iron, Dissolved          | 1.99  | 0.0013 | 0.0500 | mg/L | 2.00  |   | 99.7 | 80-120 |  |  |   |
| Magnesium, Dissolved     | 10.4  | 0.0160 | 0.0500 | mg/L | 10.0  |   | 104  | 80-120 |  |  |   |
| Manganese, Dissolved     | 0.479 | 0.0003 | 0.0010 | mg/L | 0.500 |   | 95.8 | 80-120 |  |  |   |
| Potassium, Dissolved     | 9.29  | 0.0520 | 0.500  | mg/L | 10.0  |   | 92.9 | 80-120 |  |  |   |
| Silicon, Dissolved       | 10.6  | 0.0052 | 0.0600 | mg/L | 10.0  |   | 106  | 80-120 |  |  |   |
| Sodium, Dissolved        | 9.80  | 0.0114 | 0.500  | mg/L | 10.0  |   | 98.0 | 80-120 |  |  |   |
| Sodium, Dissolved        | 10.2  | 1.90   | 50.0   | mg/L | 10.0  |   | 102  | 80-120 |  |  | J |

|                                 |        |        |        |      |  |  |  |      |    |  |   |
|---------------------------------|--------|--------|--------|------|--|--|--|------|----|--|---|
| <b>Duplicate (BFK0416-DUP1)</b> |        |        |        |      |  | Source: 17K0014-08 Prepared: 15-Nov-2017 Analyzed: 15-Nov-2017 13:51 |  |      |    |  |   |
| Aluminum, Dissolved             | ND     | 0.0085 | 0.0500 | mg/L |  | ND   |  |      |    |  | U |
| Calcium, Dissolved              | 122    | 0.0051 | 0.0500 | mg/L |  | 123  |  | 0.51 | 20 |  |   |
| Iron, Dissolved                 | 0.125  | 0.0013 | 0.0500 | mg/L |  | 0.128  |  | 2.57 | 20 |  |   |
| Magnesium, Dissolved            | 119    | 0.0160 | 0.0500 | mg/L |  | 119  |  | 0.22 | 20 |  |   |
| Manganese, Dissolved            | 0.0655 | 0.0003 | 0.0010 | mg/L |  | 0.0648   |  | 0.99 | 20 |  |   |
| Potassium, Dissolved            | 22.3   | 0.0520 | 0.500  | mg/L |  | 22.0   |  | 1.40 | 20 |  |   |
| Silicon, Dissolved              | 21.5   | 0.0052 | 0.0600 | mg/L |  | 21.3   |  | 0.78 | 20 |  |   |
| Sodium, Dissolved               | 215    | 0.0114 | 0.500  | mg/L |  | 212  |  | 1.18 | 20 |  | E |
| Sodium, Dissolved               | 189    | 1.90   | 50.0   | mg/L |  | 188  |  | 0.66 | 20 |  |   |

|                                 |        |        |        |      |  |  |  |       |    |  |   |
|---------------------------------|--------|--------|--------|------|--|--|--|-------|----|--|---|
| <b>Duplicate (BFK0416-DUP2)</b> |        |        |        |      |  | Source: 17K0014-10 Prepared: 15-Nov-2017 Analyzed: 15-Nov-2017 14:06 |  |       |    |  |   |
| Aluminum, Dissolved             | 0.0596 | 0.0085 | 0.0500 | mg/L |  | 0.0737   |  | 21.00 | 20 |  | L |
| Calcium, Dissolved              | 37.0   | 0.0051 | 0.0500 | mg/L |  | 36.9   |  | 0.18  | 20 |  |   |
| Iron, Dissolved                 | 11.3   | 0.0013 | 0.0500 | mg/L |  | 11.3   |  | 0.43  | 20 |  |   |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0416 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte               | Result | Detection Limit           | Reporting Limit | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-----------------|-------|-----------------------|---------------|-----------------------------|-------------|------|-----------|-------|
| <b>Duplicate (BFK0416-DUP2)</b> |        | <b>Source: 17K0014-10</b> |                 |       | Prepared: 15-Nov-2017 |               | Analyzed: 15-Nov-2017 14:06 |             |      |           |       |
| Magnesium, Dissolved            | 18.5   | 0.0160                    | 0.0500          | mg/L  |                       | 18.4          |                             |             | 0.64 | 20        |       |
| Manganese, Dissolved            | 3.06   | 0.0003                    | 0.0010          | mg/L  |                       | 3.04          |                             |             | 0.78 | 20        |       |
| Potassium, Dissolved            | 3.56   | 0.0520                    | 0.500           | mg/L  |                       | 3.50          |                             |             | 1.65 | 20        |       |
| Silicon, Dissolved              | 28.6   | 0.0052                    | 0.0600          | mg/L  |                       | 28.3          |                             |             | 0.91 | 20        |       |
| Sodium, Dissolved               | 148    | 0.0114                    | 0.500           | mg/L  |                       | 146           |                             |             | 1.00 | 20        | E     |
| Sodium, Dissolved               | 138    | 1.90                      | 50.0            | mg/L  |                       | 136           |                             |             | 1.57 | 20        |       |

|                                   |       |                           |        |      |                       |        |                             |        |  |  |    |
|-----------------------------------|-------|---------------------------|--------|------|-----------------------|--------|-----------------------------|--------|--|--|----|
| <b>Matrix Spike (BFK0416-MS1)</b> |       | <b>Source: 17K0014-08</b> |        |      | Prepared: 15-Nov-2017 |        | Analyzed: 15-Nov-2017 14:00 |        |  |  |    |
| Aluminum, Dissolved               | 2.09  | 0.0085                    | 0.0500 | mg/L | 2.00                  | ND     | 104                         | 75-125 |  |  |    |
| Calcium, Dissolved                | 130   | 0.0051                    | 0.0500 | mg/L | 10.0                  | 123    | 76.0                        | 75-125 |  |  |    |
| Iron, Dissolved                   | 2.10  | 0.0013                    | 0.0500 | mg/L | 2.00                  | 0.128  | 98.8                        | 75-125 |  |  |    |
| Magnesium, Dissolved              | 128   | 0.0160                    | 0.0500 | mg/L | 10.0                  | 119    | 86.3                        | 75-125 |  |  |    |
| Manganese, Dissolved              | 0.532 | 0.0003                    | 0.0010 | mg/L | 0.500                 | 0.0648 | 93.5                        | 75-125 |  |  |    |
| Potassium, Dissolved              | 33.3  | 0.0520                    | 0.500  | mg/L | 10.0                  | 22.0   | 113                         | 75-125 |  |  |    |
| Silicon, Dissolved                | 30.7  | 0.0052                    | 0.0600 | mg/L | 10.0                  | 21.3   | 93.3                        | 75-125 |  |  |    |
| Sodium, Dissolved                 | 223   | 0.0114                    | 0.500  | mg/L | 10.0                  | 212    | 109                         | 75-125 |  |  | E  |
| Sodium, Dissolved                 | 204   | 1.90                      | 50.0   | mg/L | 10.0                  | 188    | 160                         | 75-125 |  |  | HC |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                           |        |      |                       |        |                             |        |  |  |    |
|-----------------------------------|------|---------------------------|--------|------|-----------------------|--------|-----------------------------|--------|--|--|----|
| <b>Matrix Spike (BFK0416-MS2)</b> |      | <b>Source: 17K0014-10</b> |        |      | Prepared: 15-Nov-2017 |        | Analyzed: 15-Nov-2017 14:14 |        |  |  |    |
| Aluminum, Dissolved               | 2.09 | 0.0085                    | 0.0500 | mg/L | 2.00                  | 0.0737 | 101                         | 75-125 |  |  |    |
| Calcium, Dissolved                | 44.7 | 0.0051                    | 0.0500 | mg/L | 10.0                  | 36.9   | 77.9                        | 75-125 |  |  |    |
| Iron, Dissolved                   | 12.7 | 0.0013                    | 0.0500 | mg/L | 2.00                  | 11.3   | 73.5                        | 75-125 |  |  | HC |
| Magnesium, Dissolved              | 27.4 | 0.0160                    | 0.0500 | mg/L | 10.0                  | 18.4   | 90.3                        | 75-125 |  |  |    |
| Manganese, Dissolved              | 3.37 | 0.0003                    | 0.0010 | mg/L | 0.500                 | 3.04   | 66.8                        | 75-125 |  |  | HC |
| Potassium, Dissolved              | 13.9 | 0.0520                    | 0.500  | mg/L | 10.0                  | 3.50   | 104                         | 75-125 |  |  |    |
| Silicon, Dissolved                | 36.9 | 0.0052                    | 0.0600 | mg/L | 10.0                  | 28.3   | 85.3                        | 75-125 |  |  |    |
| Sodium, Dissolved                 | 153  | 0.0114                    | 0.500  | mg/L | 10.0                  | 146    | 62.9                        | 75-125 |  |  | E  |
| Sodium, Dissolved                 | 144  | 1.90                      | 50.0   | mg/L | 10.0                  | 136    | 81.7                        | 75-125 |  |  |    |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

Wet Chemistry - Quality Control

Batch BFK0035 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units  | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|--------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0035-BLK1)</b>     |        | Prepared: 01-Nov-2017 Analyzed: 03-Nov-2017 18:27 |        |   |               |      |             |      |           |       |
| Chloride                        | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Fluoride                        | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| Orthophosphorus                 | ND     | 0.10  | mg-P/L |   |               |      |             |      |           | U     |
| Sulfate                         | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| <b>Blank (BFK0035-BLK2)</b>     |        | Prepared: 01-Nov-2017 Analyzed: 10-Nov-2017 11:28 |        |   |               |      |             |      |           |       |
| Bromide                         | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| <b>LCS (BFK0035-BS1)</b>        |        | Prepared: 01-Nov-2017 Analyzed: 03-Nov-2017 18:46 |        |   |               |      |             |      |           |       |
| Chloride                        | 1.52   | 0.100   | mg/L   | 1.50  |               | 102  | 90-110      |      |           |       |
| Fluoride                        | 1.53   | 0.100   | mg/L   | 1.50  |               | 102  | 90-110      |      |           |       |
| Nitrate-N                       | 1.55   | 0.100   | mg-N/L | 1.50  |               | 103  | 90-110      |      |           |       |
| Nitrite-N                       | 1.57   | 0.100   | mg-N/L | 1.50  |               | 104  | 90-110      |      |           |       |
| Orthophosphorus                 | 1.48   | 0.10  | mg-P/L | 1.50  |               | 98.8 | 90-110      |      |           |       |
| Sulfate                         | 1.53   | 0.100   | mg/L   | 1.50  |               | 102  | 90-110      |      |           |       |
| <b>LCS (BFK0035-BS2)</b>        |        | Prepared: 01-Nov-2017 Analyzed: 10-Nov-2017 11:47 |        |   |               |      |             |      |           |       |
| Bromide                         | 1.47   | 0.100   | mg/L   | 1.50  |               | 97.7 | 90-110      |      |           |       |
| <b>Duplicate (BFK0035-DUP1)</b> |        | Source: 17K0014-02                                |        | Prepared: 01-Nov-2017 Analyzed: 03-Nov-2017 15:24 |               |      |             |      |           |       |
| Fluoride                        | 0.621  | 0.500   | mg/L   |   | 0.635         |      |             | 2.23 | 20        | D     |
| Nitrate-N                       | ND     | 0.500   | mg-N/L |   | ND            |      |             |      |           | H, U  |
| Nitrite-N                       | ND     | 0.500   | mg-N/L |   | ND            |      |             |      |           | H, U  |
| Orthophosphorus                 | ND     | 0.50  | mg-P/L |   | ND            |      |             |      |           | U     |
| <b>Duplicate (BFK0035-DUP3)</b> |        | Source: 17K0014-02RE1                             |        | Prepared: 01-Nov-2017 Analyzed: 10-Nov-2017 12:27 |               |      |             |      |           |       |
| Bromide                         | 34.5   | 2.00  | mg/L   |   | 36.1          |      |             | 4.28 | 20        | D     |
| <b>Duplicate (BFK0035-DUP4)</b> |        | Source: 17K0014-02RE3                             |        | Prepared: 01-Nov-2017 Analyzed: 10-Nov-2017 20:53 |               |      |             |      |           |       |
| Chloride                        | 10200  | 400   | mg/L   |   | 10200         |      |             | 0.29 | 20        | D     |
| <b>Duplicate (BFK0035-DUP5)</b> |        | Source: 17K0014-02RE3                             |        | Prepared: 01-Nov-2017 Analyzed: 10-Nov-2017 21:13 |               |      |             |      |           |       |
| Chloride                        | 10100  | 400   | mg/L   |   | 10200         |      |             | 1.72 | 20        | D     |
| <b>Duplicate (BFK0035-DUP7)</b> |        | Source: 17K0014-02                                |        | Prepared: 01-Nov-2017 Analyzed: 12-Nov-2017 00:46 |               |      |             |      |           |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

### Wet Chemistry - Quality Control

#### Batch BFK0035 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit           | Units  | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes   |
|-----------------------------------|--------|---------------------------|--------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|---------|
| <b>Duplicate (BFK0035-DUP7)</b>   |        | <b>Source: 17K0014-02</b> |        | Prepared: 01-Nov-2017 |               | Analyzed: 12-Nov-2017 00:46 |             |     |           |         |
| Fluoride                          | ND     | 100                       | mg/L   |                       | 0.635         |                             |             |     |           | U       |
| Sulfate                           | 1460   | 100                       | mg/L   |                       | ND            |                             |             |     |           | D       |
| <b>Duplicate (BFK0035-DUP8)</b>   |        | <b>Source: 17K0014-02</b> |        | Prepared: 01-Nov-2017 |               | Analyzed: 12-Nov-2017 01:05 |             |     |           |         |
| Fluoride                          | ND     | 100                       | mg/L   |                       | 0.635         |                             |             |     |           | U       |
| Sulfate                           | 1460   | 100                       | mg/L   |                       | ND            |                             |             |     |           | D       |
| <b>Matrix Spike (BFK0035-MS1)</b> |        | <b>Source: 17K0014-02</b> |        | Prepared: 01-Nov-2017 |               | Analyzed: 03-Nov-2017 16:23 |             |     |           |         |
| Fluoride                          | 2.17   | 0.500                     | mg/L   | 2.00                  | 0.635         | 76.8                        | 75-125      |     |           | D       |
| Nitrate-N                         | 1.57   | 0.500                     | mg-N/L | 2.00                  | ND            | 78.4                        | 75-125      |     |           | H, D    |
| Nitrite-N                         | 1.77   | 0.500                     | mg-N/L | 2.00                  | ND            | 88.6                        | 75-125      |     |           | H, D    |
| Orthophosphorus                   | ND     | 0.50                      | mg-P/L | 2.00                  | ND            |                             | 75-125      |     |           | *, H, U |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                           |      |                       |       |                             |        |  |  |   |
|-----------------------------------|------|---------------------------|------|-----------------------|-------|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFK0035-MS2)</b> |      | <b>Source: 17K0014-02</b> |      | Prepared: 01-Nov-2017 |       | Analyzed: 03-Nov-2017 17:23 |        |  |  |   |
| Fluoride                          | 2.21 | 0.500                     | mg/L | 2.00                  | 0.635 | 78.9                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                              |      |                       |      |                             |        |  |  |   |
|-----------------------------------|------|------------------------------|------|-----------------------|------|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFK0035-MS5)</b> |      | <b>Source: 17K0014-02RE1</b> |      | Prepared: 01-Nov-2017 |      | Analyzed: 12-Nov-2017 00:07 |        |  |  |   |
| Bromide                           | 84.2 | 5.00                         | mg/L | 50.0                  | 36.1 | 96.3                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**Wet Chemistry - Quality Control**

**Batch BFK0082 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0082-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:48 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFK0082-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:48 |      |             |      |           |       |
| Dissolved Solids                | 494    | 5.0                       | mg/L  | 500         |   | 98.8 | 90-110      |      |           |       |
| <b>Duplicate (BFK0082-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17K0014-08</b> |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:48 |      |             |      |           |       |
| Dissolved Solids                | 1400   | 20.0                      | mg/L  |             | 1360  |      |             | 2.76 | 20        |       |
| <b>Duplicate (BFK0082-DUP2)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17K0014-10</b> |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 09:48 |      |             |      |           |       |
| Dissolved Solids                | 559    | 10.0                      | mg/L  |             | 541   |      |             | 3.27 | 20        |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

Wet Chemistry - Quality Control

Batch BFK0096 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units  | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|--------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0096-BLK1)</b>     |        | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 19:25 |        |   |               |      |             |      |           |       |
| Chloride                        | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Fluoride                        | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |   |               |      |             |      |           | U     |
| Orthophosphorus                 | ND     | 0.10  | mg-P/L |   |               |      |             |      |           | U     |
| Sulfate                         | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| <b>Blank (BFK0096-BLK2)</b>     |        | Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 04:34 |        |   |               |      |             |      |           |       |
| Bromide                         | ND     | 0.100   | mg/L   |   |               |      |             |      |           | U     |
| <b>LCS (BFK0096-BS1)</b>        |        | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 20:24 |        |   |               |      |             |      |           |       |
| Chloride                        | 1.35   | 0.100   | mg/L   | 1.50  |               | 90.2 | 90-110      |      |           |       |
| Fluoride                        | 1.48   | 0.100   | mg/L   | 1.50  |               | 98.5 | 90-110      |      |           |       |
| Nitrate-N                       | 1.37   | 0.100   | mg-N/L | 1.50  |               | 91.6 | 90-110      |      |           |       |
| Nitrite-N                       | 1.37   | 0.100   | mg-N/L | 1.50  |               | 91.5 | 90-110      |      |           |       |
| Orthophosphorus                 | 1.22   | 0.10  | mg-P/L | 1.50  |               | 81.2 | 90-110      |      |           | *     |
| Sulfate                         | 1.37   | 0.100   | mg/L   | 1.50  |               | 91.0 | 90-110      |      |           |       |
| <b>LCS (BFK0096-BS3)</b>        |        | Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 04:54 |        |   |               |      |             |      |           |       |
| Bromide                         | 1.43   | 0.100   | mg/L   | 1.50  |               | 95.6 | 90-110      |      |           |       |
| <b>Duplicate (BFK0096-DUP1)</b> |        | <b>Source: 17K0014-08</b>                         |        | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 21:04 |               |      |             |      |           |       |
| Fluoride                        | ND     | 0.500   | mg/L   |   | ND            |      |             |      |           | U     |
| Nitrate-N                       | ND     | 0.500   | mg-N/L |   | ND            |      |             |      |           | H, U  |
| Nitrite-N                       | ND     | 0.500   | mg-N/L |   | ND            |      |             |      |           | H, U  |
| Orthophosphorus                 | ND     | 0.50  | mg-P/L |   | ND            |      |             |      |           | U     |
| Sulfate                         | ND     | 0.500   | mg/L   |   | ND            |      |             |      |           | U     |
| <b>Duplicate (BFK0096-DUP2)</b> |        | <b>Source: 17K0014-10</b>                         |        | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 22:04 |               |      |             |      |           |       |
| Fluoride                        | 1.30   | 0.500   | mg/L   |   | 1.29          |      |             | 0.62 | 20        | D     |
| Nitrate-N                       | ND     | 0.500   | mg-N/L |   | ND            |      |             |      |           | H, U  |
| Nitrite-N                       | ND     | 0.500   | mg-N/L |   | ND            |      |             |      |           | H, U  |
| Orthophosphorus                 | 0.74   | 0.50  | mg-P/L |   | 0.77          |      |             | 4.51 | 20        | D     |
| <b>Duplicate (BFK0096-DUP3)</b> |        | <b>Source: 17K0014-08RE1</b>                      |        | Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 05:34 |               |      |             |      |           |       |
| Bromide                         | 2.15   | 0.500   | mg/L   |   | 2.17          |      |             | 0.79 | 20        | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

### Wet Chemistry - Quality Control

#### Batch BFK0096 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|-----------------|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Duplicate (BFK0096-DUP4)</b> Source: 17K0014-10RE1 Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 07:19   |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | ND     | 0.500           | mg/L   |             | ND            |      |             |      |           | U     |
| <b>Duplicate (BFK0096-DUP5)</b> Source: 17K0014-10RE2 Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 17:05   |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 37.4   | 2.00            | mg/L   |             | 37.5          |      |             | 0.12 | 20        | D     |
| Fluoride  | ND     | 2.00            | mg/L   |             | ND            |      |             |      |           | U     |
| Sulfate   | 33.5   | 2.00            | mg/L   |             | 33.3          |      |             | 0.62 | 20        | D     |
| <b>DL (BFK0096-DUP6)</b> Source: 17K0014-08RE2 Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 20:02          |        |                 |        |             |               |      |             |      |           |       |
| Chloride  | 640    | 50.0            | mg/L   |             | 649           |      |             | 1.40 | 20        | D     |
| Fluoride  | ND     | 50.0            | mg/L   |             | ND            |      |             |      |           | U     |
| Sulfate   | ND     | 50.0            | mg/L   |             | ND            |      |             |      |           | U     |
| <b>Matrix Spike (BFK0096-MS1)</b> Source: 17K0014-08 Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 21:24    |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 2.07   | 0.500           | mg/L   | 2.00        | ND            | 104  | 75-125      |      |           | D     |
| Nitrate-N   | 2.08   | 0.500           | mg-N/L | 2.00        | ND            | 104  | 75-125      |      |           | H, D  |
| Nitrite-N   | 1.96   | 0.500           | mg-N/L | 2.00        | ND            | 98.0 | 75-125      |      |           | H, D  |
| Orthophosphorus   | 1.86   | 0.50            | mg-P/L | 2.00        | ND            | 92.9 | 75-125      |      |           | D     |
| Sulfate   | 2.09   | 0.500           | mg/L   | 2.00        | ND            | 104  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFK0096-MS2)</b> Source: 17K0014-10 Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 22:24    |        |                 |        |             |               |      |             |      |           |       |
| Fluoride  | 3.40   | 0.500           | mg/L   | 2.00        | 1.29          | 106  | 75-125      |      |           | D     |
| Nitrate-N   | 1.98   | 0.500           | mg-N/L | 2.00        | ND            | 99.2 | 75-125      |      |           | H, D  |
| Nitrite-N   | 1.98   | 0.500           | mg-N/L | 2.00        | ND            | 99.1 | 75-125      |      |           | H, D  |
| Orthophosphorus   | 2.48   | 0.50            | mg-P/L | 2.00        | 0.77          | 85.6 | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFK0096-MS3)</b> Source: 17K0014-08RE1 Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 06:38 |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 11.5   | 1.00            | mg/L   | 10.0        | 2.17          | 93.3 | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFK0096-MS4)</b> Source: 17K0014-10RE1 Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 07:39 |        |                 |        |             |               |      |             |      |           |       |
| Bromide   | 8.72   | 1.00            | mg/L   | 10.0        | ND            | 87.2 | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only.                               |        |                 |        |             |               |      |             |      |           |       |
| <b>Matrix Spike (BFK0096-MS5)</b> Source: 17K0014-10RE2 Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 18:03 |        |                 |        |             |               |      |             |      |           |       |



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**Reported:**  
10-Jan-2018 14:05

**Wet Chemistry - Quality Control**

**Batch BFK0096 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit              | Units | Spike Level           | Source Result | %REC                        | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|------------------------------|-------|-----------------------|---------------|-----------------------------|-------------|-----|-----------|-------|
| <b>Matrix Spike (BFK0096-MS5)</b> |        | <b>Source: 17K0014-10RE2</b> |       | Prepared: 03-Nov-2017 |               | Analyzed: 11-Nov-2017 18:03 |             |     |           |       |
| Chloride                          | 89.6   | 5.00                         | mg/L  | 50.0                  | 37.5          | 104                         | 75-125      |     |           | D     |
| Sulfate                           | 88.3   | 5.00                         | mg/L  | 50.0                  | 33.3          | 110                         | 75-125      |     |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                              |      |                       |     |                             |        |  |  |   |
|-----------------------------------|------|------------------------------|------|-----------------------|-----|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFK0096-MS6)</b> |      | <b>Source: 17K0014-08RE2</b> |      | Prepared: 03-Nov-2017 |     | Analyzed: 11-Nov-2017 20:22 |        |  |  |   |
| Chloride                          | 1590 | 100                          | mg/L | 1000                  | 649 | 94.5                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

Wet Chemistry - Quality Control

Batch BFK0144 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level                                       | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|------------|---|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFK0144-BLK1)</b>     |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 11:52 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| <b>Blank (BFK0144-BLK2)</b>     |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 16:45 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| <b>Duplicate (BFK0144-DUP1)</b> |        | <b>Source: 17K0014-08</b>                         |            | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 11:52 |               |      |              |      |           |       |
| Alkalinity, Total               | 334    | 1.00  | mg/L CaCO3 |   | 335           |      |              | 0.31 | 20        |       |
| <b>Duplicate (BFK0144-DUP2)</b> |        | <b>Source: 17K0014-10</b>                         |            | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 11:52 |               |      |              |      |           |       |
| Alkalinity, Total               | 378    | 1.00  | mg/L CaCO3 |   | 375           |      |              | 0.83 | 20        |       |
| <b>Reference (BFK0144-SRM1)</b> |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 11:52 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | 107    | 1.00  | mg/L CaCO3 | 108   |               | 99.0 | 90.37-108.33 |      |           |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

Wet Chemistry - Quality Control

Batch BFK0432 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte   | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---|--------|---|-------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0432-BLK1)</b>   |        | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 07:54 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | ND     | 1.00  | mg/L  |   |               |      |             |      |           | U     |
| <b>LCS (BFK0432-BS1)</b>  |        | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 08:21 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 19.7   | 1.00  | mg/L  | 20.0  |               | 98.5 | 90-110      |      |           | D     |
| <b>Duplicate (BFK0432-DUP1)</b>   |        | <b>Source: 17K0014-08</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 09:40 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 2.95   | 1.00  | mg/L  |   | 2.95          |      |             | 0.27 | 20        | D     |
| <b>Duplicate (BFK0432-DUP2)</b>   |        | <b>Source: 17K0014-10</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 10:44 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 10.4   | 1.00  | mg/L  |   | 10.4          |      |             | 0.10 | 20        | D     |
| <b>Matrix Spike (BFK0432-MS1)</b>   |        | <b>Source: 17K0014-08</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 10:02 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 23.1   | 1.00  | mg/L  | 20.0  | 2.95          | 101  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |       |   |               |      |             |      |           |       |
| <b>Matrix Spike (BFK0432-MS2)</b>   |        | <b>Source: 17K0014-10</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 11:06 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved   | 31.2   | 1.00  | mg/L  | 20.0  | 10.4          | 104  | 75-125      |      |           | D     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |       |   |               |      |             |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
10-Jan-2018 14:05

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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10-Jan-2018 14:05

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

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Reported:  
10-Jan-2018 14:05

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



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**Reported:**  
10-Jan-2018 14:05

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Reported:  
10-Jan-2018 14:05

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- Q Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- H Hold time violation - Hold time was exceeded.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



29 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17K0038

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: **11-2-17**  
 Page: **1** of **2**  
 No. of Coolers: \_\_\_\_\_  
 Cooler Temps: \_\_\_\_\_

Turn-around Requested: **Normal**  
 ARI Assigned Number: **17K0038**  
 ARI Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Phone: **360-570-1700**

Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kermer / D Pickering**

| Sample ID   | Date  | Time | Matrix | No. Containers | Analysis Requested  |   |  |   |   |  |                                      |                            | Notes/Comments   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|---|---|------|--------|----------------|---|---|--|---|---|--|--------------------------------------|----------------------------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
|   |   |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A   | Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide, Nitrate,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0                                | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-122+60-2-110217  | 11-2-17   | 820  | Water  | 3              |   | X   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-122+60-2-110217-(20)   |   | 820  |        | 3              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-126+90-1-110217  |   | 945  |        | 3              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-126+90-1-110217-(20)   |   | 945  |        | 3              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-581-3R-110217  |   | 930  |        | 3              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-581-3R-110217-(20)   |   | 930  |        | 3              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-482-3-110217   |   | 940  |        | 3              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-482-3-110217-(20)  |   | 940  |        | 3              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-481-3-110217   |   | 1030 |        | 4              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-481-3-110217-(20)  |   | 1030 |        | 4              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-3A1-3R-110217  |   | 1040 |        | 3              |   |   |  |   |   | X  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Comments/Special Instructions   | Relinquished by: <i>Luke Kerne</i><br>(Signature)<br>Printed Name: <b>Luke Kerne</b><br>Company: <b>DOF</b><br>Date & Time: <b>11-20-17</b> |      |        |                | Received by: <i>David Walker</i><br>(Signature)<br>Printed Name: <b>David Walker</b><br>Company: <b>ARI</b><br>Date & Time: <b>11/02/2017</b> |   |  |   | Relinquished by: <i>David Walker</i><br>(Signature)<br>Printed Name: <b>David Walker</b><br>Company: <b>ARI</b><br>Date & Time: <b>11/02/2017</b> |  |                                      |                            | Received by: _____<br>(Signature)<br>Printed Name: _____<br>Company: _____<br>Date & Time: _____ |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| submit EDD to PIONEER<br>sing PIONEER EDD format<br>fill to Port of Tacoma<br>O#79227 |   |      |        |                |   |   |  |   |   |  |                                      |                            |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSD/PA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-895-6200 206-895-6201 (fax)



Date: **11-2-17**  
 Page: **2** of **2**  
 No. of Coolers: \_\_\_\_\_  
 Cooler Temps: \_\_\_\_\_

ARI Assigned Number: **17K0038**  
 ARI Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Turn-around Requested: **Normal**  
 Phone: **360-570-1700**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**  
 Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kermer / D Pickering**

| Sample ID                     | Date    | Time | Matrix | No. Containers | Analysis Requested                          |   |  |   |   |  |                                      | Notes/Comments |                            |  |  |  |  |  |   |
|-------------------------------|---------|------|--------|----------------|---|---|--|---|---|--|--------------------------------------|----------------|----------------------------|--|--|--|--|--|---|
|                               |         |      |        |                | Total As. Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide, Nitrate,<br>Chloride, Fluoride, Nitrate,<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 |                | Dissolved DOC<br>SM 5310 B |  |  |  |  |  |   |
| GW-3A1-3R-110217-(207)        | 11-2-17 | 1040 | water  | 3              | X   |   |  |   | X   | X  | X                                    | X              |                            |  |  |  |  |  | All dissolved samples field filtered 0.45um |
| GW-EB-110217                  | 11-2-17 | 1145 |        | 4              | X   | X   |  | X   | X   |  |                                      |                | X                          |  |  |  |  |  |   |
| EB-110217                     |         | 1145 |        | 4              |   |   |  |   | X   |  |                                      |                | X                          |  |  |  |  |  |   |
| GW-7E5-3-110217               |         | 1305 |        | 4              | X   | X   |  | X   | X   |  |                                      |                | X                          |  |  |  |  |  |   |
| GW-7E5-3-110217-(206)         |         | 1305 |        | 4              | X   | X   |  | X   | X   |  |                                      |                | X                          |  |  |  |  |  |   |
| GW-VEB-3-110217               |         | 1310 |        | 4              | X   |   |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
| GW-VEB-3-110217-(20)          |         | 1310 |        | 4              | X   | X   |  | X   | X   |  |                                      |                | X                          |  |  |  |  |  |   |
|                               |         |      |        |                |   |   |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
|                               |         |      |        |                |   |   |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
|                               |         |      |        |                |   |   |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
|                               |         |      |        |                |   |   |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
| Comments/Special Instructions |         |      |        |                | Relinquished by (Signature)                 | Received by (Signature)                         |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
| submit EDD to PIONEER         |         |      |        |                | Printed Name                                | Printed Name                                    |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
| sing PIONEER EDD format       |         |      |        |                | Company                                     | Company   |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
| fill to Port of Tacoma        |         |      |        |                |   |   |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
| #079227                       |         |      |        |                | Date & Time                                 | Date & Time                                     |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |
|                               |         |      |        |                | 11-02-17                                    | 11/02/17  |  |   |   |  |                                      |                |                            |  |  |  |  |  |   |

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI releases ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSD/DAP/SEP/SMS protocol will be stored frozen for up to one year and then discarded.





WORK ORDER

17K0038

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: 79227

Preservation Confirmation

| Container ID | Container Type                    | pH         |
|--------------|-----------------------------------|------------|
| 17K0038-01 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-01 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-01 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-02 A | Large OJ, 1000 mL                 | FF         |
| 17K0038-02 B | Small OJ, 500 mL, no headspace    | FF         |
| 17K0038-02 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF CZ pass |
| 17K0038-03 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-03 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-03 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-04 A | Large OJ, 1000 mL                 | FF         |
| 17K0038-04 B | Small OJ, 500 mL, no headspace    | FF         |
| 17K0038-04 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF CZ pass |
| 17K0038-05 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-05 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-05 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-06 A | Large OJ, 1000 mL                 | FF         |
| 17K0038-06 B | Small OJ, 500 mL, no headspace    | FF         |
| 17K0038-06 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF CZ pass |
| 17K0038-07 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-07 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-07 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-08 A | Large OJ, 1000 mL                 | FF         |
| 17K0038-08 B | Small OJ, 500 mL, no headspace    | FF         |
| 17K0038-08 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF CZ pass |
| 17K0038-09 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-09 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-09 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0038-09 D | HDPE NM, 500 mL, 1:1 HNO3         | CZ pass    |
| 17K0038-10 A | Large OJ, 1000 mL                 | FF         |
| 17K0038-10 B | Small OJ, 500 mL, no headspace    | FF         |
| 17K0038-10 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF CZ pass |



WORK ORDER

17K0038

|   |                                      |   |
|---|--------------------------------------|---|
| <b>Client: Pioneer Technologies Corporation</b>                 |                                      | <b>Project Manager: Amanda Volgardsen</b> |
| <b>Project: Port of Tacoma Arkema- FS Data Gap Investigatio</b> |                                      | <b>Project Number: 79227</b>              |
| 17K0038-10 D  | HDPE NM, 500 mL, 1:1 HNO3 (FF)       | L2 pass                                   |
| 17K0038-11 A  | Sm VOA Vial, Clear, 40 mL, HCL       |   |
| 17K0038-11 B  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-11 C  | Pb VOA Vial, Clear, 40 mL, HCL       |   |
| 17K0038-12 A  | Large OJ, 1000 mL FF                 |   |
| 17K0038-12 B  | Small OJ, 500 mL, no headspace FF    |   |
| 17K0038-12 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass                                   |
| 17K0038-13 A  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-13 B  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-13 C  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-13 D  | HDPE NM, 500 mL, 1:1 HNO3            | L2 pass                                   |
| 17K0038-14 A  | Large OJ, 1000 mL FF                 |   |
| 17K0038-14 B  | Small OJ, 500 mL, no headspace FF    |   |
| 17K0038-14 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass                                   |
| 17K0038-14 D  | HDPE NM, 500 mL, 1:1 HNO3 (FF)       | L2 pass                                   |
| 17K0038-15 A  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-15 B  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-15 C  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-15 D  | HDPE NM, 500 mL, 1:1 HNO3            | L2 pass                                   |
| 17K0038-16 A  | Large OJ, 1000 mL FF                 |   |
| 17K0038-16 B  | Small OJ, 500 mL, no headspace FF    |   |
| 17K0038-16 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass                                   |
| 17K0038-16 D  | HDPE NM, 500 mL, 1:1 HNO3 (FF)       | L2 pass                                   |
| 17K0038-17 A  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-17 B  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-17 C  | VOA Vial, Clear, 40 mL, HCL          |   |
| 17K0038-17 D  | HDPE NM, 500 mL, 1:1 HNO3            | L2 pass                                   |
| 17K0038-18 A  | Large OJ, 1000 mL FF                 |   |
| 17K0038-18 B  | Small OJ, 500 mL, no headspace FF    |   |
| 17K0038-18 C  | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass                                   |
| 17K0038-18 D  | HDPE NM, 500 mL, 1:1 HNO3 (FF)       | L2 pass                                   |

SF

11/2/17

Preservation Confirmed By

Date





# Cooler Receipt Form

ARI Client: Pioneer Technologies

Project Name: Arkema ESDG Investigation

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17K0038

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time: 1425 9:19

Temp Gun ID#: 1005206

If cooler temperature is out of compliance fill out form 00070F

Cooler Accepted by: SBW Date: 11/2/2017 Time: 1425

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO

Were all VOC vials free of air bubbles? ..... NA YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI ..... NA

Was Sample Split by ARI :  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: SF Date: 11/02/17 Time: 1604

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle       | Sample ID on COC   | Sample ID on Bottle | Sample ID on COC   |
|---------------------------|--------------------|---------------------|--------------------|
| IA1B1C GW-122+60-2-103017 | GW-122+60-2-110217 |                     |                    |
| 3A3B GW-126+90-1-103117   | GW-126+90-1-110217 | GW-126+90-1-110117  | GW-126+90-1-110217 |
|                           |                    | EB-110217-(20)      | EB-110217          |

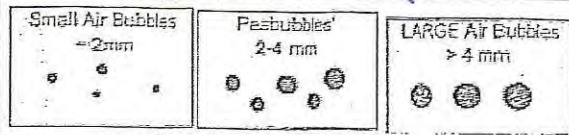
**Additional Notes, Discrepancies, & Resolutions:**

Sample time on IA1B1C different from COC on bottle label  
(820 on COC 1445 on bottle label)

Sample date on IA1B1C different on COC  
(11/2/17 on COC 10/30/17 on bottle)

Sample date on 3A3B different on COC (11/2/17) bottle (10/31/17)

Sample date on 3C different on COC (11/2/17) bottle (11/01/17)



Small → "sm" (<2 mm)  
Peabubbles → "pb" (2 to <4 mm) air bubbles  
Large → "lg" (4 to <6 mm) on preservation  
Headspace → "hs" (>6 mm)





# Cooler Temperature Compliance Form

| Cooler#:                      | Temperature(°C): <u>9.1°C</u> |             |
|-------------------------------|-------------------------------|-------------|
| Sample ID                     | Bottle Count                  | Bottle Type |
| <u>Samples received above</u> | <u>6°C</u>                    |             |
|                               |                               |             |
|                               |                               |             |
|                               |                               |             |
|                               |                               |             |
|                               |                               |             |
|                               |                               |             |
|                               |                               |             |

| Cooler#:  | Temperature(°C): |             |
|-----------|------------------|-------------|
| Sample ID | Bottle Count     | Bottle Type |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |

| Cooler#:  | Temperature(°C): |             |
|-----------|------------------|-------------|
| Sample ID | Bottle Count     | Bottle Type |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |

| Cooler#:  | Temperature(°C): |             |
|-----------|------------------|-------------|
| Sample ID | Bottle Count     | Bottle Type |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |
|           |                  |             |

Completed by: SBW Date: 11/2/2017 Time: 1425



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID               | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-------------------------|---------------|--------|-------------------|-------------------|
| GW-122+60-2-110217      | 17K0038-01    | Water  | 02-Nov-2017 08:20 | 02-Nov-2017 14:25 |
| GW-122+60-2-110217-(20) | 17K0038-02    | Water  | 02-Nov-2017 08:20 | 02-Nov-2017 14:25 |
| GW-126+90-1-110217      | 17K0038-03    | Water  | 02-Nov-2017 09:45 | 02-Nov-2017 14:25 |
| GW-126+90-1-110217-(20) | 17K0038-04    | Water  | 02-Nov-2017 09:45 | 02-Nov-2017 14:25 |
| GW-5B1-3R-110217        | 17K0038-05    | Water  | 02-Nov-2017 09:30 | 02-Nov-2017 14:25 |
| GW-5B1-3R-110217-(20)   | 17K0038-06    | Water  | 02-Nov-2017 09:30 | 02-Nov-2017 14:25 |
| GW-4B2-3-110217         | 17K0038-07    | Water  | 02-Nov-2017 09:40 | 02-Nov-2017 14:25 |
| GW-4B2-3-110217-(20)    | 17K0038-08    | Water  | 02-Nov-2017 09:40 | 02-Nov-2017 14:25 |
| GW-4B1-3-110217         | 17K0038-09    | Water  | 02-Nov-2017 10:30 | 02-Nov-2017 14:25 |
| GW-4B1-3-110217-(20)    | 17K0038-10    | Water  | 02-Nov-2017 10:30 | 02-Nov-2017 14:25 |
| GW-3A1-3R-110217        | 17K0038-11    | Water  | 02-Nov-2017 10:40 | 02-Nov-2017 14:25 |
| GW-3A1-3R-110217-(20)   | 17K0038-12    | Water  | 02-Nov-2017 10:40 | 02-Nov-2017 14:25 |
| EB-110217               | 17K0038-13    | Water  | 02-Nov-2017 11:45 | 02-Nov-2017 14:25 |
| EB-110217-(20)          | 17K0038-14    | Water  | 02-Nov-2017 11:45 | 02-Nov-2017 14:25 |
| GW-7E5-3-110217         | 17K0038-15    | Water  | 02-Nov-2017 13:05 | 02-Nov-2017 14:25 |
| GW-7E5-3-110217-(20)    | 17K0038-16    | Water  | 02-Nov-2017 13:05 | 02-Nov-2017 14:25 |
| GW-6E8-3-110217         | 17K0038-17    | Water  | 02-Nov-2017 13:10 | 02-Nov-2017 14:25 |
| GW-6E8-3-110217-(20)    | 17K0038-18    | Water  | 02-Nov-2017 13:10 | 02-Nov-2017 14:25 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received November 2, 2017 under ARI workorder 17K0038. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-4B1-3-110217. The matrix spike percent recovery and duplicate RPD were within QC limits.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFK0202 has Nickel detected below the reporting limit, but above the method detection limit. The Nickel has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.



Pioneer Technologies Corporation  
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Reported:  
29-Nov-2017 13:20

#### **Dissolved Metals - EPA Method 6010C**

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Iron and Sodium detected below the reporting limits, but above the method detection limits. The Iron and Sodium have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

#### **Anions - EPA Method 300.0**

The samples were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS has low percent recovery for O-Phos. This is likely due to chromatographic interference and matrix interference. All other LCS percent recoveries were within control limits. No corrective action was taken.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

A duplicate was prepared in conjunction with sampe GW-122+60-2-110217-(20). The duplicate RPD was within QC limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sampe GW-122+60-2-110217-(20). The duplicate RPD was within QC limits.

#### **Dissolved Organic Carbon - Method SM5310**





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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:20

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-122+60-2-110217**  
**17K0038-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 08:20  
Analyzed: 09-Nov-2017 18:55

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0245 Sample Size: 2 mL  
Prepared: 09-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.29            | 1.00            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.14            | 1.00            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.24            | 1.00            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.24            | 1.00            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 105   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.5  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 100   | %     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-122+60-2-110217-(20)**  
**17K0038-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 08:20  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>16500</b> | mg/L  |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-122+60-2-110217-(20)**  
**17K0038-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 08:20  
Analyzed: 03-Nov-2017 22:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | 8.40   | mg-P/L | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-122+60-2-110217-(20)**  
**17K0038-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/02/2017 08:20

Instrument: Accumet AR60

Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1490   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1490   | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-122+60-2-110217-(20)**  
**17K0038-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 08:20  
Analyzed: 17-Nov-2017 15:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>37.8</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-122+60-2-110217-(20)**  
**17K0038-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 08:20  
Analyzed: 11-Nov-2017 07:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>18.1</b> | mg/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-122+60-2-110217-(20)**  
**17K0038-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 08:20  
Analyzed: 11-Nov-2017 18:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | <b>183</b> | mg/L  | D     |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-122+60-2-110217-(20)**  
**17K0038-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 08:20  
Analyzed: 11-Nov-2017 20:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 4000     | 400             | <b>10200</b> | mg/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-126+90-1-110217**  
**17K0038-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 09:45  
Analyzed: 09-Nov-2017 19:21

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0245 Sample Size: 10 mL  
Prepared: 09-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 115 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 95.4 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 103 %  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-126+90-1-110217-(20)**  
**17K0038-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 09:45  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>18700</b> | mg/L  |       |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-126+90-1-110217-(20)**  
**17K0038-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:45  
Analyzed: 03-Nov-2017 23:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.597</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-126+90-1-110217-(20)**  
**17K0038-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/02/2017 09:45  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 119    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 119    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-126+90-1-110217-(20)**  
**17K0038-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 09:45  
Analyzed: 17-Nov-2017 16:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.26</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-126+90-1-110217-(20)**  
**17K0038-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:45  
Analyzed: 11-Nov-2017 08:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>43.5</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-126+90-1-110217-(20)**  
**17K0038-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:45  
Analyzed: 11-Nov-2017 21:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>13000</b> | mg/L  | D     |





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**Reported:**  
29-Nov-2017 13:20

**GW-126+90-1-110217-(20)**  
**17K0038-04RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:45  
Analyzed: 14-Nov-2017 16:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1940</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-5B1-3R-110217**  
**17K0038-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 09:30  
Analyzed: 09-Nov-2017 19:46

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0245 Sample Size: 10 mL  
Prepared: 09-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 106   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.4  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.9  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102   | %     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-5B1-3R-110217-(20)**  
**17K0038-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 09:30  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 50 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>2040</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-5B1-3R-110217-(20)**  
**17K0038-06 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:30  
Analyzed: 03-Nov-2017 23:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-5B1-3R-110217-(20)**  
**17K0038-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/02/2017 09:30  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 424    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 424    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-5B1-3R-110217-(20)**  
**17K0038-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 09:30  
Analyzed: 18-Nov-2017 13:38

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>3.33</b> | mg/L  | D     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
29-Nov-2017 13:20

**GW-5B1-3R-110217-(20)**  
**17K0038-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:30  
Analyzed: 11-Nov-2017 08:37

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>3.24</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
29-Nov-2017 13:20

**GW-5B1-3R-110217-(20)**  
**17K0038-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:30  
Analyzed: 11-Nov-2017 22:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1010</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-4B2-3-110217**  
**17K0038-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 09:40  
Analyzed: 10-Nov-2017 13:21

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 113   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 98.2  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-4B2-3-110217-(20)**  
**17K0038-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 09:40  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>25700</b> | mg/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-4B2-3-110217-(20)**  
**17K0038-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:40  
Analyzed: 04-Nov-2017 00:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.502</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>2.81</b> | mg-P/L | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-4B2-3-110217-(20)**  
**17K0038-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/02/2017 09:40  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 1040   | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 1040   | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B2-3-110217-(20)**  
**17K0038-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 09:40  
Analyzed: 18-Nov-2017 13:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 13.2   | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B2-3-110217-(20)**  
**17K0038-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:40  
Analyzed: 11-Nov-2017 08:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 10       | 1.00            | <b>14.5</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-4B2-3-110217-(20)**  
**17K0038-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:40  
Analyzed: 11-Nov-2017 19:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>21.1</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-4B2-3-110217-(20)**  
**17K0038-08RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 09:40  
Analyzed: 11-Nov-2017 22:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>16800</b> | mg/L  | D     |





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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-4B1-3-110217**  
**17K0038-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 10:30  
Analyzed: 10-Nov-2017 13:46

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units       | Notes    |
|--|------------|----------|-----------------|-----------------|-----------------|-------------|----------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>16.5</b>     | ug/L        |          |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>19.3</b>     | ug/L        |          |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>6.41</b>     | ug/L        |          |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.90</b>     | ug/L        |          |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>108</i>  | <i>%</i> |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>95.1</i> | <i>%</i> |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>97.9</i> | <i>%</i> |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>102</i>  | <i>%</i> |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217**  
**17K0038-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/02/2017 10:30  
Analyzed: 11-Nov-2017 02:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217**  
**17K0038-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/02/2017 10:30  
Analyzed: 11-Nov-2017 02:46

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 0.110           | 1.00            | <b>0.745</b> | ug/L  | J, D  |
| Copper  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 5        | 0.250           | 2.50            | ND           | ug/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217**  
**17K0038-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/02/2017 10:30  
Analyzed: 08-Nov-2017 16:54

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0208 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/02/2017 10:30  
Analyzed: 10-Nov-2017 15:10

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>118</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 5        | 0.0065          | 0.250           | <b>5.25</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>195</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 5        | 0.0017          | 0.0050          | <b>0.424</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>134</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>17.5</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>3010</b>  | mg/L  |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/02/2017 10:30  
Analyzed: 14-Nov-2017 23:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 5        | 0.340           | 0.500           | ND     | ug/L  | U     |



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Reported:  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/02/2017 10:30  
Analyzed: 14-Nov-2017 23:44

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | <b>0.830</b> | ug/L  | J, D  |
| Copper, Dissolved  | 7440-50-8  | 5        | 1.70            | 2.50            | ND           | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 5        | 0.250           | 2.50            | ND           | ug/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/02/2017 10:30  
Analyzed: 08-Nov-2017 14:47

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0133  
Prepared: 06-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 10:30  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>8220</b> | mg/L  |       |



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Reported:  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 10:30  
Analyzed: 04-Nov-2017 00:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |



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Reported:  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/02/2017 10:30

Instrument: Accumet AR60

Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 531    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 531    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 10:30  
Analyzed: 18-Nov-2017 14:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>6.01</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 10:30  
Analyzed: 11-Nov-2017 09:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>7.31</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 10:30  
Analyzed: 14-Nov-2017 16:38

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 2.00            | <b>59.8</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-4B1-3-110217-(20)**  
**17K0038-10RE5 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 10:30  
Analyzed: 14-Nov-2017 16:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 2000     | 200             | <b>5370</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-3A1-3R-110217**  
**17K0038-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 10:40  
Analyzed: 10-Nov-2017 14:11

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 104   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 100   | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 94.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-3A1-3R-110217-(20)**  
**17K0038-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 10:40  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 50 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1650</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-3A1-3R-110217-(20)**  
**17K0038-12 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 10:40  
Analyzed: 04-Nov-2017 01:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.55</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>0.995</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-3A1-3R-110217-(20)**  
**17K0038-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/02/2017 10:40  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 342    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 342    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-3A1-3R-110217-(20)**  
**17K0038-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 10:40  
Analyzed: 18-Nov-2017 14:51

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 2.77   | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-3A1-3R-110217-(20)**  
**17K0038-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 10:40  
Analyzed: 11-Nov-2017 09:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | 2.72   | mg/L  | D     |



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Project Number: 79227  
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**Reported:**  
29-Nov-2017 13:20

**GW-3A1-3R-110217-(20)**  
**17K0038-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 10:40  
Analyzed: 11-Nov-2017 23:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>810</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 13:20

**EB-110217**  
**17K0038-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 11:45  
Analyzed: 10-Nov-2017 12:30

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.06</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 106 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.8 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 96.0 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 98.0 % |       |



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**Reported:**  
29-Nov-2017 13:20

**EB-110217**  
**17K0038-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/02/2017 11:45  
Analyzed: 11-Nov-2017 02:51

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |





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**Reported:**  
29-Nov-2017 13:20

**EB-110217**  
**17K0038-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/02/2017 11:45  
Analyzed: 10-Nov-2017 02:11

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.0260</b> | ug/L  | J     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND            | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.0920</b> | ug/L  | J     |



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**Reported:**  
29-Nov-2017 13:20

**EB-110217**

**17K0038-13 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/02/2017 11:45  
Analyzed: 08-Nov-2017 16:59

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0208  
Prepared: 08-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/02/2017 11:45  
Analyzed: 10-Nov-2017 15:14

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | ND            | mg/L  | U     |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0070</b> | mg/L  | J     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | ND            | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | ND            | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>0.169</b>  | mg/L  | J     |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | ND            | mg/L  | U     |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | <b>1.69</b>   | mg/L  |       |



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**Reported:**  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/02/2017 11:45  
Analyzed: 14-Nov-2017 23:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/02/2017 11:45  
Analyzed: 14-Nov-2017 23:50

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | ND     | ug/L  | U     |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND     | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/02/2017 11:45  
Analyzed: 08-Nov-2017 14:49

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0133 Sample Size: 20 mL  
Prepared: 06-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 11:45  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 200 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Solids |            | 1        | 5.0             | ND     | mg/L  | U     |



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Reported:  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 11:45  
Analyzed: 04-Nov-2017 01:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |





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Reported:  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/02/2017 11:45  
Analyzed: 06-Nov-2017 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |



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**Reported:**  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 11:45  
Analyzed: 18-Nov-2017 15:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | ND     | mg/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**EB-110217-(20)**  
**17K0038-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 11:45  
Analyzed: 11-Nov-2017 16:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |



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Reported:  
29-Nov-2017 13:20

**GW-7E5-3-110217**  
**17K0038-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 13:05  
Analyzed: 10-Nov-2017 14:36

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 104 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 99.2 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 94.9 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101 %  |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217**  
**17K0038-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/02/2017 13:05  
Analyzed: 10-Nov-2017 02:16

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217**  
**17K0038-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/02/2017 13:05  
Analyzed: 10-Nov-2017 02:16

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.158</b> | ug/L  | J     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | <b>0.354</b> | ug/L  | J     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.168</b> | ug/L  | J     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217**  
**17K0038-15 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/02/2017 13:05  
Analyzed: 08-Nov-2017 17:05

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0208 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/02/2017 13:05  
Analyzed: 10-Nov-2017 15:18

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>67.1</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0531</b> | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>44.4</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0305</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>14.8</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>19.4</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>120</b>    | mg/L  |       |





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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/02/2017 13:05  
Analyzed: 14-Nov-2017 23:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/02/2017 13:05  
Analyzed: 14-Nov-2017 23:55

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.0940</b> | ug/L  | J     |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND            | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | ND            | ug/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/02/2017 13:05  
Analyzed: 08-Nov-2017 14:50

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0133  
Prepared: 06-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 13:05  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 75 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>776</b> | mg/L  |       |



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Reported:  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 13:05  
Analyzed: 04-Nov-2017 01:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.74</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>1.02</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/02/2017 13:05  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 254    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 254    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 13:05  
Analyzed: 18-Nov-2017 15:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0432 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.62</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 13:05  
Analyzed: 11-Nov-2017 10:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>1.02</b> | mg/L  | D     |





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**Reported:**  
29-Nov-2017 13:20

**GW-7E5-3-110217-(20)**  
**17K0038-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 13:05  
Analyzed: 11-Nov-2017 23:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 100      | 10.0            | <b>297</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 13:20

**GW-6E8-3-110217**  
**17K0038-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/02/2017 13:10  
Analyzed: 10-Nov-2017 15:02

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 105   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.1  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 95.6  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |



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**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217**  
**17K0038-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/02/2017 13:10  
Analyzed: 10-Nov-2017 02:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | <b>0.155</b> | ug/L  |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217**  
**17K0038-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/02/2017 13:10  
Analyzed: 10-Nov-2017 02:21

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0202 Sample Size: 25 mL  
Prepared: 08-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.545</b> | ug/L  |       |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND           | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.478</b> | ug/L  | J     |



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**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217**  
**17K0038-17 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/02/2017 13:10  
Analyzed: 08-Nov-2017 17:07

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0208 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/02/2017 13:10  
Analyzed: 10-Nov-2017 15:23

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>98.8</b>   | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.135</b>  | mg/L  |       |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>62.0</b>   | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0479</b> | mg/L  |       |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>18.7</b>   | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>19.6</b>   | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>188</b>    | mg/L  |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/02/2017 13:10  
Analyzed: 15-Nov-2017 00:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/02/2017 13:10  
Analyzed: 15-Nov-2017 00:00

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.180</b>  | ug/L  | J     |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND            | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.0810</b> | ug/L  | J     |





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**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/02/2017 13:10  
Analyzed: 08-Nov-2017 14:52

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0133  
Prepared: 06-Nov-2017

Sample Size: 20 mL  
Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/02/2017 13:10  
Analyzed: 03-Nov-2017 14:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0089 Sample Size: 100 mL  
Prepared: 03-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 10.0            | <b>1140</b> | mg/L  |       |



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Reported:  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 13:10  
Analyzed: 04-Nov-2017 02:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.68</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/02/2017 13:10  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 298    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 298    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/02/2017 13:10  
Analyzed: 18-Nov-2017 18:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 2.75   | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 13:10  
Analyzed: 11-Nov-2017 11:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>1.59</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**GW-6E8-3-110217-(20)**  
**17K0038-18RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/02/2017 13:10  
Analyzed: 11-Nov-2017 23:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0096 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>484</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

### Volatile Organic Compounds - Quality Control

#### Batch BFK0245 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0245-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 09-Nov-2017 10:38 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 5.13   |                 |                 | ug/L  | 5.00        |   | 103  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.94   |                 |                 | ug/L  | 5.00        |   | 98.9 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.83   |                 |                 | ug/L  | 5.00        |   | 96.6 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.10   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFK0245-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 09-Nov-2017 08:55 |      |             |      |           |       |
| Vinyl Chloride                    | 10.2   | 0.06            | 0.20            | ug/L  | 10.0        |   | 102  | 66-133      |      |           |       |
| Chloroform                        | 10.2   | 0.03            | 0.20            | ug/L  | 10.0        |   | 102  | 80-122      |      |           |       |
| Trichloroethene                   | 9.85   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.5 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.71   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.1 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 5.12   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 5.03   |                 |                 | ug/L  | 5.00        |   | 101  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.06   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.93   |                 |                 | ug/L  | 5.00        |   | 98.7 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.02   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <b>LCS Dup (BFK0245-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 09-Nov-2017 09:21 |      |             |      |           |       |
| Vinyl Chloride                    | 10.0   | 0.06            | 0.20            | ug/L  | 10.0        |   | 100  | 66-133      | 1.97 | 30        |       |
| Chloroform                        | 10.1   | 0.03            | 0.20            | ug/L  | 10.0        |   | 101  | 80-122      | 1.48 | 30        |       |
| Trichloroethene                   | 9.58   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.8 | 80-120      | 2.78 | 30        |       |
| Tetrachloroethene                 | 9.65   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.5 | 80-120      | 0.60 | 30        |       |
| Surrogate: Dibromofluoromethane   | 5.00   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 5.24   |                 |                 | ug/L  | 5.00        |   | 105  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.97   |                 |                 | ug/L  | 5.00        |   | 99.3 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.97   |                 |                 | ug/L  | 5.00        |   | 99.5 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.05   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**Volatile Organic Compounds - Quality Control**

**Batch BFK0296 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0296-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 11:40 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 5.36   |                 |                 | ug/L  | 5.00        |   | 107  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.93   |                 |                 | ug/L  | 5.00        |   | 98.6 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.81   |                 |                 | ug/L  | 5.00        |   | 96.2 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| <b>LCS (BFK0296-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 09:33 |      |             |      |           |       |
| Vinyl Chloride                    | 9.67   | 0.06            | 0.20            | ug/L  | 10.0        |   | 96.7 | 66-133      |      |           |       |
| Chloroform                        | 9.75   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.5 | 80-122      |      |           |       |
| Trichloroethene                   | 9.74   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.4 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.61   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.1 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.92   |                 |                 | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.91   |                 |                 | ug/L  | 5.00        |   | 98.3 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 5.05   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.84   |                 |                 | ug/L  | 5.00        |   | 96.7 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0296-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 09:58 |      |             |      |           |       |
| Vinyl Chloride                    | 9.84   | 0.06            | 0.20            | ug/L  | 10.0        |   | 98.4 | 66-133      | 1.71 | 30        |       |
| Chloroform                        | 9.83   | 0.03            | 0.20            | ug/L  | 10.0        |   | 98.3 | 80-122      | 0.86 | 30        |       |
| Trichloroethene                   | 9.66   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.6 | 80-120      | 0.85 | 30        |       |
| Tetrachloroethene                 | 9.47   | 0.05            | 0.20            | ug/L  | 10.0        |   | 94.7 | 80-120      | 1.52 | 30        |       |
| Surrogate: Dibromofluoromethane   | 5.07   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 5.20   |                 |                 | ug/L  | 5.00        |   | 104  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.96   |                 |                 | ug/L  | 5.00        |   | 99.1 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 5.08   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.93   |                 |                 | ug/L  | 5.00        |   | 98.7 | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0202 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0202-BLK1)</b> |         |        |                 |                 |       | Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 00:48 |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| <b>Blank (BFK0202-BLK2)</b> |         |        |                 |                 |       | Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 01:40 |               |      |             |     |           |       |
| Copper                      | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 62      | 0.225  | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | J     |
| <b>LCS (BFK0202-BS1)</b>    |         |        |                 |                 |       | Prepared: 08-Nov-2017 Analyzed: 10-Nov-2017 00:29 |               |      |             |     |           |       |
| Lead                        | 208     | 26.4   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 106  | 80-120      |     |           |       |
| Arsenic                     | 75a     | 28.3   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 113  | 80-120      |     |           |       |
| <b>LCS (BFK0202-BS2)</b>    |         |        |                 |                 |       | Prepared: 08-Nov-2017 Analyzed: 11-Nov-2017 02:29 |               |      |             |     |           |       |
| Arsenic                     | 75a     | 28.2   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 113  | 80-120      |     |           |       |
| Copper                      | 63      | 28.4   | 0.340           | 0.500           | ug/L  | 25.0  |               | 114  | 80-120      |     |           |       |
| Copper                      | 65      | 27.9   | 0.350           | 0.500           | ug/L  | 25.0  |               | 112  | 80-120      |     |           |       |
| Nickel                      | 60      | 27.6   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 110  | 80-120      |     |           |       |
| Nickel                      | 62      | 28.8   | 0.220           | 0.500           | ug/L  | 25.0  |               | 115  | 80-120      |     |           |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0208 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result   | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|----------|---|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0208-BLK1)</b>       |          | Prepared: 08-Nov-2017 Analyzed: 08-Nov-2017 16:38 |       |   |               |      |             |     |           |       |
| Mercury                           | ND       | 0.000100  | mg/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0208-BS1)</b>          |          | Prepared: 08-Nov-2017 Analyzed: 08-Nov-2017 16:46 |       |   |               |      |             |     |           |       |
| Mercury                           | 0.00222  | 0.000100  | mg/L  | 0.00200   |               | 111  | 80-120      |     |           |       |
| <b>Duplicate (BFK0208-DUP1)</b>   |          | <b>Source: 17K0038-09</b>                         |       | Prepared: 08-Nov-2017 Analyzed: 08-Nov-2017 16:56 |               |      |             |     |           |       |
| Mercury                           | ND       | 0.000100  | mg/L  |   | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BFK0208-MS1)</b> |          | <b>Source: 17K0038-09</b>                         |       | Prepared: 08-Nov-2017 Analyzed: 08-Nov-2017 16:58 |               |      |             |     |           |       |
| Mercury                           | 0.000950 | 0.000100  | mg/L  | 0.00100   | ND            | 95.0 | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>29-Nov-2017 13:20 |
|--|--|---------------------------------------|

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0133 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0133-BLK1)</b> |         |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:33 |      |             |     |           |       |
| Mercury, Dissolved          | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0133-BS1)</b>    |         |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:35 |      |             |     |           |       |
| Mercury, Dissolved          | 0.00229 | 0.000100        | mg/L  | 0.00200     |   | 115  | 80-120      |     |           |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0238 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0238-BLK1)</b> |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 14:05 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0722 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |
| <b>Blank (BFK0238-BLK2)</b> |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 13-Nov-2017 11:57 |      |             |     |           |       |
| Iron, Dissolved             | 0.0088 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0126 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0238-BS1)</b>    |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 13:40 |      |             |     |           |       |
| Aluminum, Dissolved         | 2.05   | 0.0085          | 0.0500          | mg/L  | 2.00        |   | 103  | 80-120      |     |           |       |
| Calcium, Dissolved          | 9.82   | 0.0051          | 0.0500          | mg/L  | 10.0        |   | 98.2 | 80-120      |     |           |       |
| Iron, Dissolved             | 1.96   | 0.0013          | 0.0500          | mg/L  | 2.00        |   | 98.0 | 80-120      |     |           |       |
| Magnesium, Dissolved        | 10.4   | 0.0160          | 0.0500          | mg/L  | 10.0        |   | 104  | 80-120      |     |           |       |
| Manganese, Dissolved        | 0.468  | 0.0003          | 0.0010          | mg/L  | 0.500       |   | 93.6 | 80-120      |     |           |       |
| Potassium, Dissolved        | 9.40   | 0.0520          | 0.500           | mg/L  | 10.0        |   | 94.0 | 80-120      |     |           |       |
| Silicon, Dissolved          | 9.72   | 0.0052          | 0.0600          | mg/L  | 10.0        |   | 97.2 | 80-120      |     |           |       |
| Sodium, Dissolved           | 9.88   | 0.0114          | 0.500           | mg/L  | 10.0        |   | 98.8 | 80-120      |     |           |       |
| Sodium, Dissolved           | 10.1   | 1.90            | 50.0            | mg/L  | 10.0        |   | 101  | 80-120      |     |           | J     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:20

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0325 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0325-BLK1)</b> |         |        |                 |                 |       | Prepared: 13-Nov-2017 Analyzed: 13-Nov-2017 20:33 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic, Dissolved          | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0325-BS1)</b>    |         |        |                 |                 |       | Prepared: 13-Nov-2017 Analyzed: 13-Nov-2017 20:53 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | 28.4   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 114  | 80-120      |     |           |       |
| Arsenic, Dissolved          | 75a     | 26.5   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 106  | 80-120      |     |           |       |
| Copper, Dissolved           | 63      | 26.7   | 0.340           | 0.500           | ug/L  | 25.0  |               | 107  | 80-120      |     |           |       |
| Copper, Dissolved           | 65      | 25.9   | 0.350           | 0.500           | ug/L  | 25.0  |               | 104  | 80-120      |     |           |       |
| Nickel, Dissolved           | 60      | 25.9   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 103  | 80-120      |     |           |       |
| Nickel, Dissolved           | 62      | 25.4   | 0.220           | 0.500           | ug/L  | 25.0  |               | 102  | 80-120      |     |           |       |



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**Reported:**  
29-Nov-2017 13:20

**Wet Chemistry - Quality Control**

**Batch BFK0089 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|-------|-----------|-------|
| <b>Blank (BFK0089-BLK1)</b>     |        |                           |       |             |   |      |             |       |           |       |
|                                 |        |                           |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 14:06 |      |             |       |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |       |           | U     |
| <b>LCS (BFK0089-BS1)</b>        |        |                           |       |             |   |      |             |       |           |       |
|                                 |        |                           |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 14:06 |      |             |       |           |       |
| Dissolved Solids                | 509    | 5.0                       | mg/L  | 500         |   | 102  | 90-110      |       |           |       |
| <b>Duplicate (BFK0089-DUP1)</b> |        |                           |       |             |   |      |             |       |           |       |
|                                 |        | <b>Source: 17K0038-02</b> |       |             | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 14:06 |      |             |       |           |       |
| Dissolved Solids                | 18600  | 200                       | mg/L  |             | 16500   |      |             | 11.50 | 20        |       |



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Reported:  
29-Nov-2017 13:20

Wet Chemistry - Quality Control

Batch BFK0096 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte           | Result | Reporting Limit                                   | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|---|--------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0096-BLK1)</b> |        | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 19:25 |        |             |               |      |             |     |           |       |
| Chloride                    | ND     | 0.100   | mg/L   |             |               |      |             |     |           | U     |
| Fluoride                    | ND     | 0.100   | mg/L   |             |               |      |             |     |           | U     |
| Nitrate-N                   | ND     | 0.100   | mg-N/L |             |               |      |             |     |           | U     |
| Nitrite-N                   | ND     | 0.100   | mg-N/L |             |               |      |             |     |           | U     |
| Orthophosphorus             | ND     | 0.10  | mg-P/L |             |               |      |             |     |           | U     |
| Sulfate                     | ND     | 0.100   | mg/L   |             |               |      |             |     |           | U     |
| <b>Blank (BFK0096-BLK2)</b> |        | Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 04:34 |        |             |               |      |             |     |           |       |
| Bromide                     | ND     | 0.100   | mg/L   |             |               |      |             |     |           | U     |
| <b>LCS (BFK0096-BS1)</b>    |        | Prepared: 03-Nov-2017 Analyzed: 03-Nov-2017 20:24 |        |             |               |      |             |     |           |       |
| Chloride                    | 1.35   | 0.100   | mg/L   | 1.50        |               | 90.2 | 90-110      |     |           |       |
| Fluoride                    | 1.48   | 0.100   | mg/L   | 1.50        |               | 98.5 | 90-110      |     |           |       |
| Nitrate-N                   | 1.37   | 0.100   | mg-N/L | 1.50        |               | 91.6 | 90-110      |     |           |       |
| Nitrite-N                   | 1.37   | 0.100   | mg-N/L | 1.50        |               | 91.5 | 90-110      |     |           |       |
| Orthophosphorus             | 1.22   | 0.10  | mg-P/L | 1.50        |               | 81.2 | 90-110      |     |           | *     |
| Sulfate                     | 1.37   | 0.100   | mg/L   | 1.50        |               | 91.0 | 90-110      |     |           |       |
| <b>LCS (BFK0096-BS3)</b>    |        | Prepared: 03-Nov-2017 Analyzed: 11-Nov-2017 04:54 |        |             |               |      |             |     |           |       |
| Bromide                     | 1.43   | 0.100   | mg/L   | 1.50        |               | 95.6 | 90-110      |     |           |       |





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Reported:  
29-Nov-2017 13:20

Wet Chemistry - Quality Control

Batch BFK0157 - No Prep Wet Chem

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level                                       | Source Result | %REC | %REC Limits  | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|------------|---|---------------|------|--------------|------|-----------|-------|
| <b>Blank (BFK0157-BLK1)</b>     |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 14:59 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| <b>Blank (BFK0157-BLK2)</b>     |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 17:15 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |      |           | U     |
| <b>Duplicate (BFK0157-DUP1)</b> |        | <b>Source: 17K0038-02</b>                         |            | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 14:59 |               |      |              |      |           |       |
| Alkalinity, Total               | 1480   | 1.00  | mg/L CaCO3 |   | 1490          |      |              | 0.77 | 20        |       |
| <b>Reference (BFK0157-SRM1)</b> |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 14:59 |            |   |               |      |              |      |           |       |
| Alkalinity, Total               | 107    | 1.00  | mg/L CaCO3 | 108   |               | 99.0 | 90.37-108.33 |      |           |       |



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**Reported:**  
29-Nov-2017 13:20

**Wet Chemistry - Quality Control**

**Batch BFK0432 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>Blank (BFK0432-BLK1)</b>         |        |                 |       |             |               | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 07:54 |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 1.00            | mg/L  |             |               |   |             |     |           | U     |
| <b>LCS (BFK0432-BS1)</b>            |        |                 |       |             |               | Prepared: 15-Nov-2017 Analyzed: 17-Nov-2017 08:21 |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 19.7   | 1.00            | mg/L  | 20.0        |               | 98.5  | 90-110      |     |           | D     |



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**Reported:**  
29-Nov-2017 13:20

**Wet Chemistry - Quality Control**

**Batch BFK0433 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: KK

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0433-BLK1)</b>         |        |                 |       |             | Prepared: 15-Nov-2017 Analyzed: 18-Nov-2017 16:35 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0433-BS1)</b>            |        |                 |       |             | Prepared: 15-Nov-2017 Analyzed: 18-Nov-2017 16:59 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 19.8   | 1.00            | mg/L  | 20.0        |   | 98.9 | 90-110      |     |           | D     |



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Reported:  
29-Nov-2017 13:20

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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Reported:  
29-Nov-2017 13:20

|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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Reported:  
29-Nov-2017 13:20

|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227

Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:20

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.





29 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17K0066

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



**Chain of Custody Record & Laboratory Analysis Request**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: 11-3-17 of 2  
 Page: 1  
 No. of Coolers: 1  
 Cooler Temps: 2

Turn-around Requested: Normal  
 Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227

| Sample ID | Date | Time | Matrix | No. Containers | Analysis Requested                       |  |  |   |  |  |                                   |                         |   |  |  |  | Notes/Comments |
|-----------|------|------|--------|----------------|--|--|--|---|--|--|-----------------------------------|-------------------------|---|--|--|--|----------------|
|           |      |      |        |                | Total As, Cu, Pb, Ni, Hg EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg EPA 6020A/7470A | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Fe, Al, Ca, Mg, Mn, K, Si, Na EPA 6010C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B | All dissolved samples field filtered 0.45µm |  |  |  |                |

|                         |         |      |       |   |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|-------------------------|---------|------|-------|---|--|---|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| GW-121+80-1-110317      | 11-3-17 | 910  | Water | 3 |  | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-121+80-1-110317-(20) |         | 910  |       |   |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-122+60-1-110317      |         | 905  |       |   |  | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-122+60-1-110317-(20) |         | 905  |       |   |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-122+60-3-110317      |         | 1000 |       |   |  | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| GW-122+60-3-110317-(20) |         | 1000 |       |   |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| r-122+60-0-110317       |         | 950  |       |   |  | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| r-122+60-0-110317-(20)  |         | 950  |       |   |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| r-124+00-3-110317       |         | 1100 |       |   |  | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| r-124+00-3-110317-(20)  |         | 1100 |       |   |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| w-125+60-3-110317       |         | 1240 |       |   |  | X |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

| Comments/Special Instructions  | Relinquished by (Signature) | Printed Name | Company | Date & Time  | Received by (Signature) | Printed Name     | Company | Date & Time  |
|--|-----------------------------|--------------|---------|--------------|-------------------------|------------------|---------|--------------|
| Submit EDD to PIONEER<br>inquire PIONEER EDD format<br>to Port of Tacoma<br>#79227 | <i>Luhe Kerker</i>          | Luhe Kerker  | DOT     | 11-3-17 7600 | <i>Stephanie Fisher</i> | Stephanie Fisher | ARI     | 11/3/17 1600 |

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **17K0066** Turn-around Requested: **Normal** Date: **11-3-17**

ARI Client Company: **Pioneer Technologies** Phone: **360-570-1700** Page: **2** of **2**

Client Contact: **Troy Bussey (busseyt@uspioneer.com)** No. of Coolers: **2** Cooler Temps:

Client Project Name: **Arkema FS DG Inv** Client Project #: **79227** Samplers: **D Cooper 206-660-3466**  
**T Dreher / L Kerner / D Pickering**

| Sample ID               | Date    | Time | Matrix | No. Containers | Analysis Requested                          |   |                       |  |   |   |  |                                      |                            |   | Notes/Comments |   |
|-------------------------|---------|------|--------|----------------|---|---|-----------------------|--|---|---|--|--------------------------------------|----------------------------|---|----------------|---|
|                         |         |      |        |                | Total As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Dissolved As, Cu, Pb, Ni, Hg<br>EPA 6020A/7470A | Hg<br>EPA 6020A/7470A | PCE, TCE, Vinyl chloride,<br>Chloroform<br>EPA 8260C | Dissolved Fe, Al, Ca, Mg,<br>Mn, K, Si, Na<br>EPA 6010C | Dissolved Sulfate, Ortho-<br>phosphorus, Bromide,<br>Chloride, Fluoride, Nitrate,<br>Nitrite<br>EPA 300.0 | Dissolved Alkalinity as<br>Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B |   |                |   |
| GW-125+50-3-110317-(20) | 11-3-17 | 1240 | Water  | 3              | X   | X   | X                     | X  | X   | X   | X  | X                                    | X                          | X | X              | All dissolved samples field filtered 0.45uM |
| GW-128+30-3-110317      | 1245    |      |        |                | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| GW-128+30-3-110317-(20) | 1245    |      |        |                | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| GW-129+60-3-110317      | 1340    |      |        |                | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| GW-129+60-3-110317-(20) | 1340    |      |        |                | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| GW-131+00-3-110317      | 1400    |      |        |                | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| GW-131+00-3-110317-(20) | 1400    |      |        |                | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| GW-101-3-110317         | 1140    |      |        | 4              | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| GW-101-3-110317-(20)    | 1140    |      |        | 4              | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| EB-110317               | 1430    |      |        | 4              | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |
| EB-110317-(20)          | 1430    |      |        | 4              | X   |   |                       |  |   |   |  |                                      |                            |   |                |   |

Relinquished by (Signature): *[Signature]* Received by (Signature): *[Signature]*

Printed Name: **Lyke Kerner** Printed Name: **Stephanie Fernald**

Company: **DOF** Company: **ARI**

Date & Time: **11-3-17** Date & Time: **11/3/17 1600**

Comments/Special Instructions: **Submit EDD to PIONEER using PIONEER EDD format file to Port of Tacoma D#79227**

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under P-SDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)







WORK ORDER

17K0066

Client: Pioneer Technologies Corporation

Project Manager: Amanda Volgardsen

Project: Port of Tacoma Arkema- FS Data Gap Investigatio

Project Number: 79227

Preservation Confirmation

| Container ID | Container Type                       | pH      |
|--------------|--------------------------------------|---------|
| 17K0066-01 A | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-01 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-01 C | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-02 A | Large OJ, 1000 mL FF                 |         |
| 17K0066-02 B | Small OJ, 500 mL FF                  |         |
| 17K0066-02 C | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17K0066-03 A | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-03 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-03 C | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-04 A | Large OJ, 1000 mL FF                 |         |
| 17K0066-04 B | Small OJ, 500 mL FF                  |         |
| 17K0066-04 C | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17K0066-05 A | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-05 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-05 C | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-06 A | Large OJ, 1000 mL FF                 |         |
| 17K0066-06 B | Small OJ, 500 mL FF                  |         |
| 17K0066-06 C | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17K0066-07 A | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-07 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-07 C | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-08 A | Large OJ, 1000 mL FF                 |         |
| 17K0066-08 B | Small OJ, 500 mL FF                  |         |
| 17K0066-08 C | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17K0066-09 A | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-09 B | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-09 C | VOA Vial, Clear, 40 mL, HCL          |         |
| 17K0066-10 A | Large OJ, 1000 mL FF                 |         |
| 17K0066-10 B | Small OJ, 500 mL FF                  |         |
| 17K0066-10 C | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 pass |
| 17K0066-11 A | VOA Vial, Clear, 40 mL, HCL          |         |



WORK ORDER

17K0066

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> 79227              |

|              |                                   |            |
|--------------|-----------------------------------|------------|
| 17K0066-11 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-11 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-12 A | Large OJ, 1000 mL                 | FF         |
| 17K0066-12 B | Small OJ, 500 mL                  | FF         |
| 17K0066-12 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF L2 pass |
| 17K0066-13 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-13 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-13 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-14 A | Large OJ, 1000 mL                 | FF         |
| 17K0066-14 B | Small OJ, 500 mL                  | FF         |
| 17K0066-14 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF L2 pass |
| 17K0066-15 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-15 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-15 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-16 A | Large OJ, 1000 mL                 | FF         |
| 17K0066-16 B | Small OJ, 500 mL                  | FF         |
| 17K0066-16 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF L2 pass |
| 17K0066-17 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-17 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-17 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-18 A | Large OJ, 1000 mL                 | FF         |
| 17K0066-18 B | Small OJ, 500 mL                  | FF         |
| 17K0066-18 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF L2 pass |
| 17K0066-19 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-19 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-19 C | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-19 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 pass    |
| 17K0066-20 A | Large OJ, 1000 mL                 | FF         |
| 17K0066-20 B | Small OJ, 500 mL                  | FF         |
| 17K0066-20 C | Glass NM, Amber, 250 mL, 9N H2SO4 | FF L2 pass |
| 17K0066-20 D | HDPE NM, 500 mL, 1:1 HNO3 (FF)    | L2 pass    |
| 17K0066-21 A | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-21 B | VOA Vial, Clear, 40 mL, HCL       |            |
| 17K0066-21 C | VOA Vial, Clear, 40 mL, HCL       |            |





WORK ORDER

17K0066

|  |                                      |                                    |  |
|--|--------------------------------------|------------------------------------|--|
| Client: Pioneer Technologies Corporation                 |                                      | Project Manager: Amanda Volgardsen |  |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio |                                      | Project Number: 79227              |  |
| 17K0066-21 D   | HDPE NM, 500 mL, 1:1 HNO3            | L2 PAPS                            |  |
| 17K0066-22 A   | Large OJ, 1000 mL FF                 |                                    |  |
| 17K0066-22 B   | Small OJ, 500 mL FF                  |                                    |  |
| 17K0066-22 C   | Glass NM, Amber, 250 mL, 9N H2SO4 FF | L2 PAPS                            |  |
| 17K0066-22 D   | HDPE NM, 500 mL, 1:1 HNO3 (FF)       | L2 PAPS                            |  |
| 17K0066-23 A   | VOA Vial, Clear, 40 mL, HCL          |                                    |  |

SF

Preservation Confirmed By \_\_\_\_\_

11/3/17

Date \_\_\_\_\_



# Cooler Receipt Form

ARI Client: Pioneer  
 COC No(s): \_\_\_\_\_ NA  
 Assigned ARI Job No: 17K0066  
 Preliminary Examination Phase:

Project Name: Arkema FS D6 Inv  
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_ NA

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO   
 Were custody papers included with the cooler? ..... YES  NO   
 Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO   
 Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 5.6  
 Time: 1600  
 If cooler temperature is out of compliance fill out form 00070F  
 Cooler Accepted by: SF Date: 11/3/17 Time: 1600 Temp Gun ID#: D002565

*Complete custody forms and attach all shipping documents*

## Log-In Phase:

Was a temperature blank included in the cooler? ..... YES  NO   
 What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? ..... NA  YES  NO   
 Were all bottles sealed in individual plastic bags? ..... YES  NO   
 Did all bottles arrive in good condition (unbroken)? ..... YES  NO   
 Were all bottle labels complete and legible? ..... YES  NO   
 Did the number of containers listed on COC match with the number of containers received? ..... YES  NO   
 Did all bottle labels and tags agree with custody papers? ..... YES  NO   
 Were all bottles used correct for the requested analyses? ..... YES  NO   
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO   
 Were all VOC vials free of air bubbles? ..... NA  YES  NO   
 Was sufficient amount of sample sent in each bottle? ..... NA  YES  NO   
 Date VOC Trip Blank was made at ARI ..... NA  YES  NO  10/23/17  
 Was Sample Split by ARI :  NA  YES  Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: SF Date: 11/3/17 Time: 1655

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**  
lid on 22A was halfway tightened on bottle and fell off when picking up the bottle, small amount of water spilled out  
 By: SF Date: 11/3/17

|                                   |                             |                                    |   |
|-----------------------------------|-----------------------------|------------------------------------|---|
| <b>Small Air Bubbles</b><br>= 2mm | <b>Peabubbles</b><br>2-4 mm | <b>LARGE Air Bubbles</b><br>> 4 mm | Small → "sm" (<2 mm)                              |
|                                   |                             |                                    | Peabubbles → "pb" (2 to <4 mm) <u>19A 19B 19C</u> |
|                                   |                             |                                    | Large → "lg" (4 to <6 mm) <u>11B 23A</u>          |
|                                   |                             |                                    | Headspace → "hs" (>6 mm)                          |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID               | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-------------------------|---------------|--------|-------------------|-------------------|
| GW-121+80-1-110317      | 17K0066-01    | Water  | 03-Nov-2017 09:10 | 03-Nov-2017 16:00 |
| GW-121+80-1-110317-(20) | 17K0066-02    | Water  | 03-Nov-2017 09:10 | 03-Nov-2017 16:00 |
| GW-122+60-1-110317      | 17K0066-03    | Water  | 03-Nov-2017 09:05 | 03-Nov-2017 16:00 |
| GW-122+60-1-110317-(20) | 17K0066-04    | Water  | 03-Nov-2017 09:05 | 03-Nov-2017 16:00 |
| GW-122+60-3-110317      | 17K0066-05    | Water  | 03-Nov-2017 10:00 | 03-Nov-2017 16:00 |
| GW-122+60-3-110317-(20) | 17K0066-06    | Water  | 03-Nov-2017 10:00 | 03-Nov-2017 16:00 |
| GW-122+60-0-110317      | 17K0066-07    | Water  | 03-Nov-2017 09:50 | 03-Nov-2017 16:00 |
| GW-122+60-0-110317-(20) | 17K0066-08    | Water  | 03-Nov-2017 09:50 | 03-Nov-2017 16:00 |
| GW-124+00-3-110317      | 17K0066-09    | Water  | 03-Nov-2017 11:00 | 03-Nov-2017 16:00 |
| GW-124+00-3-110317-(20) | 17K0066-10    | Water  | 03-Nov-2017 11:00 | 03-Nov-2017 16:00 |
| GW-125+50-3-110317      | 17K0066-11    | Water  | 03-Nov-2017 12:40 | 03-Nov-2017 16:00 |
| GW-125+50-3-110317-(20) | 17K0066-12    | Water  | 03-Nov-2017 12:40 | 03-Nov-2017 16:00 |
| GW-128+30-3-110317      | 17K0066-13    | Water  | 03-Nov-2017 12:45 | 03-Nov-2017 16:00 |
| GW-128+30-3-110317-(20) | 17K0066-14    | Water  | 03-Nov-2017 12:45 | 03-Nov-2017 16:00 |
| GW-129+65-3-110317      | 17K0066-15    | Water  | 03-Nov-2017 13:40 | 03-Nov-2017 16:00 |
| GW-129+65-3-110317-(20) | 17K0066-16    | Water  | 03-Nov-2017 13:40 | 03-Nov-2017 16:00 |
| GW-131+00-3-110317      | 17K0066-17    | Water  | 03-Nov-2017 14:00 | 03-Nov-2017 16:00 |
| GW-131+00-3-110317-(20) | 17K0066-18    | Water  | 03-Nov-2017 14:00 | 03-Nov-2017 16:00 |
| GW-1C1-3-110317         | 17K0066-19    | Water  | 03-Nov-2017 11:40 | 03-Nov-2017 16:00 |
| GW-1C1-3-110317-(20)    | 17K0066-20    | Water  | 03-Nov-2017 11:40 | 03-Nov-2017 16:00 |
| EB-110317               | 17K0066-21    | Water  | 03-Nov-2017 14:30 | 03-Nov-2017 16:00 |
| EB-110317-(20)          | 17K0066-22    | Water  | 03-Nov-2017 14:30 | 03-Nov-2017 16:00 |
| TB                      | 17K0066-23    | Water  | 03-Nov-2017 00:00 | 03-Nov-2017 16:00 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received November 03, 2017 under ARI workorder 17K0066. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Total and Dissolved Hg - EPA Method 7470A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

### Total and Dissolved Metals - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Nickel detected below the reporting limit, but above the method detection limit. The Nickel has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

### Dissolved Metals - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Number: 79227  
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Reported:  
29-Nov-2017 13:45

Initial and continuing calibrations were within method requirements.

Method blank BFK0238 has Iron and Sodium detected below the reporting limits, but above the method detection limits. The Iron and Sodium have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

#### **Anions - EPA Method 300.0**

The samples were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-121+80-1-110317-(20). The matrix spike has a O-Phos concentration that exceeds the upper calibration range, and has been flagged with an "E" qualifier. The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **Alkalinity - Method SM2320**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

#### **Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sampe GW-122+60-1-110317-(20). The duplicate RPD was within QC limits.

#### **Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.



Pioneer Technologies Corporation  
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Olympia WA, 98503

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Project Number: 79227  
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**Reported:**  
29-Nov-2017 13:45

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample GW-121+80-1-110317-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
29-Nov-2017 13:45

**GW-121+80-1-110317**  
**17K0066-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/03/2017 09:10  
Analyzed: 10-Nov-2017 18:24

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | <b>0.68</b>     | ug/L          |       |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.03</b>     | ug/L          | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | <b>0.57</b>     | ug/L          |       |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.29</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>106 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>99.4 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>97.3 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>99.8 %</i> |       |



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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:45

**GW-121+80-1-110317-(20)**  
**17K0066-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 09:10  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 75 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>795</b> | mg/L  |       |



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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:45

**GW-121+80-1-110317-(20)**  
**17K0066-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/03/2017 09:10  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>101</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-----------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | <b>303</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>404</b> | mg/L CaCO3 |       |



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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:45

**GW-121+80-1-110317-(20)**  
**17K0066-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 09:10  
Analyzed: 18-Nov-2017 18:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 4.77   | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:45

**GW-121+80-1-110317-(20)**  
**17K0066-02RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:10  
Analyzed: 04-Nov-2017 22:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.309</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.52</b> | mg-P/L |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
29-Nov-2017 13:45

**GW-121+80-1-110317-(20)**  
**17K0066-02RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:10  
Analyzed: 12-Nov-2017 03:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>0.114</b> | mg/L  |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
29-Nov-2017 13:45

**GW-121+80-1-110317-(20)**  
**17K0066-02RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:10  
Analyzed: 14-Nov-2017 17:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 1.00            | <b>16.5</b> | mg/L  | D     |



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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:45

**GW-121+80-1-110317-(20)**  
**17K0066-02RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:10  
Analyzed: 14-Nov-2017 19:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>138</b> | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
29-Nov-2017 13:45

**GW-122+60-1-110317**  
**17K0066-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/03/2017 09:05  
Analyzed: 10-Nov-2017 18:50

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 116   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.9  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 100   | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102   | %     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-1-110317-(20)**  
**17K0066-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 09:05  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 5 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>15500</b> | mg/L  |       |



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Olympia WA, 98503

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Reported:  
29-Nov-2017 13:45

**GW-122+60-1-110317-(20)**  
**17K0066-04 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:05  
Analyzed: 04-Nov-2017 09:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.687</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
29-Nov-2017 13:45

**GW-122+60-1-110317-(20)**  
**17K0066-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/03/2017 09:05  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>109</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>109</b> | mg/L CaCO3 |       |



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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-1-110317-(20)**  
**17K0066-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 09:05  
Analyzed: 18-Nov-2017 19:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.02</b> | mg/L  | D     |





Pioneer Technologies Corporation  
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Olympia WA, 98503

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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-1-110317-(20)**  
**17K0066-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:05  
Analyzed: 12-Nov-2017 04:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>34.8</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-1-110317-(20)**  
**17K0066-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:05  
Analyzed: 14-Nov-2017 18:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 500      | 50.0            | <b>1490</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-1-110317-(20)**  
**17K0066-04RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:05  
Analyzed: 14-Nov-2017 20:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>9990</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 13:45

**GW-122+60-3-110317**  
**17K0066-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/03/2017 10:00  
Analyzed: 10-Nov-2017 19:15

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 105   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 98.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-122+60-3-110317-(20)**  
**17K0066-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 10:00  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 10 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 100             | <b>3020</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-122+60-3-110317-(20)**  
**17K0066-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/03/2017 10:00

Instrument: Accumet AR60

Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 705    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 705    | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-122+60-3-110317-(20)**  
**17K0066-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 10:00  
Analyzed: 18-Nov-2017 20:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>4.95</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-3-110317-(20)**  
**17K0066-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 10:00  
Analyzed: 04-Nov-2017 23:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.40</b> | mg-P/L |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-122+60-3-110317-(20)**  
**17K0066-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 10:00  
Analyzed: 12-Nov-2017 04:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>3.60</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-122+60-3-110317-(20)**  
**17K0066-06RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 10:00  
Analyzed: 14-Nov-2017 18:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 200      | 20.0            | <b>155</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-122+60-3-110317-(20)**  
**17K0066-06RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 10:00  
Analyzed: 14-Nov-2017 21:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1000     | 100             | <b>1670</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-122+60-0-110317**  
**17K0066-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/03/2017 09:50  
Analyzed: 10-Nov-2017 19:40

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0296 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 112   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 99.0  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.0  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105   | %     |



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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-0-110317-(20)**  
**17K0066-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 09:50  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 5 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>19600</b> | mg/L  |       |



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Reported:  
29-Nov-2017 13:45

**GW-122+60-0-110317-(20)**  
**17K0066-08 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:50  
Analyzed: 04-Nov-2017 09:47

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | <b>0.641</b> | mg/L  | D     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |



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Reported:  
29-Nov-2017 13:45

**GW-122+60-0-110317-(20)**  
**17K0066-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/03/2017 09:50  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 127    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 127    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-0-110317-(20)**  
**17K0066-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 09:50  
Analyzed: 18-Nov-2017 20:40

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.33</b> | mg/L  | D     |





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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-0-110317-(20)**  
**17K0066-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:50  
Analyzed: 12-Nov-2017 05:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 20       | 2.00            | <b>42.3</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-0-110317-(20)**  
**17K0066-08RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:50  
Analyzed: 14-Nov-2017 21:41

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 10000    | 1000            | <b>11900</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-122+60-0-110317-(20)**  
**17K0066-08RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 09:50  
Analyzed: 15-Nov-2017 13:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1730</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 13:45

**GW-124+00-3-110317**  
**17K0066-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/03/2017 11:00  
Analyzed: 10-Nov-2017 19:22

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0304 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.50</b> | ug/L  |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 111   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 94.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 86.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 106   | %     |



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**Reported:**  
29-Nov-2017 13:45

**GW-124+00-3-110317-(20)**  
**17K0066-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 11:00  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 50 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1260</b> | mg/L  |       |



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Reported:  
29-Nov-2017 13:45

**GW-124+00-3-110317-(20)**  
**17K0066-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/03/2017 11:00  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 303    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 303    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:45

**GW-124+00-3-110317-(20)**  
**17K0066-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 11:00  
Analyzed: 18-Nov-2017 21:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.36</b> | mg/L  | D     |



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Reported:  
29-Nov-2017 13:45

**GW-124+00-3-110317-(20)**  
**17K0066-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 11:00  
Analyzed: 04-Nov-2017 23:39

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.115</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.39</b> | mg-P/L |       |

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | <b>0.796</b> | mg/L  |       |





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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-124+00-3-110317-(20)**  
**17K0066-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 11:00  
Analyzed: 12-Nov-2017 06:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>2.29</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-124+00-3-110317-(20)**  
**17K0066-10RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 11:00  
Analyzed: 14-Nov-2017 22:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>606</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-125+50-3-110317**  
**17K0066-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/03/2017 12:40  
Analyzed: 10-Nov-2017 19:42

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0304 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND              | ug/L          | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND              | ug/L          | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.31</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>114 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>94.4 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>85.2 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>102 %</i>  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-125+50-3-110317-(20)**  
**17K0066-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 12:40  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 50 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1580</b> | mg/L  |       |



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Olympia WA, 98503

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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-125+50-3-110317-(20)**  
**17K0066-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/03/2017 12:40

Instrument: Accumet AR60

Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>399</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>399</b> | mg/L CaCO3 |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-125+50-3-110317-(20)**  
**17K0066-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 12:40  
Analyzed: 18-Nov-2017 21:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 3.42   | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-125+50-3-110317-(20)**  
**17K0066-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 12:40  
Analyzed: 04-Nov-2017 23:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.106</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.25</b> | mg-P/L |       |

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | <b>0.761</b> | mg/L  |       |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-125+50-3-110317-(20)**  
**17K0066-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 12:40  
Analyzed: 12-Nov-2017 06:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>2.64</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-125+50-3-110317-(20)**  
**17K0066-12RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 12:40  
Analyzed: 14-Nov-2017 22:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>827</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-128+30-3-110317**  
**17K0066-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/03/2017 12:45  
Analyzed: 10-Nov-2017 20:02

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0304 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND              | ug/L          | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND              | ug/L          | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.22</b>     | ug/L          |       |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>114 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>92.1 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>83.0 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>103 %</i>  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-128+30-3-110317-(20)**  
**17K0066-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 12:45  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 75 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 13.3            | <b>931</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-128+30-3-110317-(20)**  
**17K0066-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/03/2017 12:45  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 285    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 285    | mg/L CaCO3 |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-128+30-3-110317-(20)**  
**17K0066-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 12:45  
Analyzed: 18-Nov-2017 23:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.72</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-128+30-3-110317-(20)**  
**17K0066-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 12:45  
Analyzed: 05-Nov-2017 00:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | <b>0.108</b> | mg/L  |       |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.41</b> | mg-P/L |       |

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | <b>0.739</b> | mg/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-128+30-3-110317-(20)**  
**17K0066-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 12:45  
Analyzed: 12-Nov-2017 06:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | <b>1.38</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-128+30-3-110317-(20)**  
**17K0066-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 12:45  
Analyzed: 14-Nov-2017 22:41

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 200      | 20.0            | <b>390</b> | mg/L  | D     |





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Reported:  
29-Nov-2017 13:45

**GW-129+65-3-110317**  
**17K0066-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/03/2017 13:40  
Analyzed: 10-Nov-2017 20:23

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0304 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.18</b> | ug/L  | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 117   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 84.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 107   | %     |



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**Reported:**  
29-Nov-2017 13:45

**GW-129+65-3-110317-(20)**  
**17K0066-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 13:40  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 20 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 50.0            | <b>3010</b> | mg/L  |       |



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**Reported:**  
29-Nov-2017 13:45

**GW-129+65-3-110317-(20)**  
**17K0066-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/03/2017 13:40  
Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157 Sample Size: 100 mL  
Prepared: 06-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>581</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>581</b> | mg/L CaCO3 |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-129+65-3-110317-(20)**  
**17K0066-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 13:40  
Analyzed: 18-Nov-2017 23:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>4.26</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-129+65-3-110317-(20)**  
**17K0066-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 13:40  
Analyzed: 05-Nov-2017 01:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | <b>0.32</b> | mg-P/L |       |

| Analyte | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|--------------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | <b>0.835</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-129+65-3-110317-(20)**  
**17K0066-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 13:40  
Analyzed: 12-Nov-2017 07:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | 3.53   | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-129+65-3-110317-(20)**  
**17K0066-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 13:40  
Analyzed: 14-Nov-2017 23:00

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>1650</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-131+00-3-110317**  
**17K0066-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/03/2017 14:00  
Analyzed: 10-Nov-2017 20:43

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0304 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units         | Notes |
|--|------------|----------|-----------------|-----------------|-----------------|---------------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND              | ug/L          | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND              | ug/L          | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND              | ug/L          | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.13</b>     | ug/L          | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | <i>80-129 %</i> | <i>119 %</i>  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | <i>80-120 %</i> | <i>95.8 %</i> |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | <i>80-120 %</i> | <i>83.5 %</i> |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | <i>80-120 %</i> | <i>107 %</i>  |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-131+00-3-110317-(20)**  
**17K0066-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 14:00  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 50 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1680</b> | mg/L  |       |



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**Reported:**  
29-Nov-2017 13:45

**GW-131+00-3-110317-(20)**  
**17K0066-18 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 14:00  
Analyzed: 04-Nov-2017 21:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>1.01</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-131+00-3-110317-(20)**  
**17K0066-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/03/2017 14:00

Instrument: Accumet AR60

Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 425    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 425    | mg/L CaCO3 |       |



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**Reported:**  
29-Nov-2017 13:45

**GW-131+00-3-110317-(20)**  
**17K0066-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 14:00  
Analyzed: 18-Nov-2017 23:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>3.28</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-131+00-3-110317-(20)**  
**17K0066-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 14:00  
Analyzed: 12-Nov-2017 07:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>2.85</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-131+00-3-110317-(20)**  
**17K0066-18RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 14:00  
Analyzed: 14-Nov-2017 23:20

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>844</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-1C1-3-110317**  
**17K0066-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT2

Sampled: 11/03/2017 11:40  
Analyzed: 10-Nov-2017 21:03

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0304 Sample Size: 10 mL  
Prepared: 10-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND          | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | <b>0.10</b> | ug/L  | J     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 119   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 95.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 83.2  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 108   | %     |



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**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317**  
**17K0066-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/03/2017 11:40  
Analyzed: 16-Nov-2017 19:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0234 Sample Size: 25 mL  
Prepared: 09-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317**  
**17K0066-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/03/2017 11:40  
Analyzed: 16-Nov-2017 19:56

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0234 Sample Size: 25 mL  
Prepared: 09-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>1.58</b> | ug/L  | D     |
| Copper  | 7440-50-8  | 2        | 0.680           | 1.00            | ND          | ug/L  | U     |
| Nickel  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>4.83</b> | ug/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317**  
**17K0066-19 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/03/2017 11:40  
Analyzed: 08-Nov-2017 17:08

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0208 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/03/2017 11:40  
Analyzed: 10-Nov-2017 15:27

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238 Sample Size: 25 mL  
Prepared: 09-Nov-2017 Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND           | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | <b>71.8</b>  | mg/L  |       |
| Iron, Dissolved      | 7439-89-6  | 2        | 0.0026          | 0.100           | <b>1.28</b>  | mg/L  | D     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | <b>96.8</b>  | mg/L  |       |
| Manganese, Dissolved | 7439-96-5  | 2        | 0.0007          | 0.0020          | <b>0.142</b> | mg/L  | D     |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>50.1</b>  | mg/L  |       |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | <b>17.6</b>  | mg/L  |       |
| Sodium, Dissolved    | 7440-23-5  | 1        | 1.90            | 50.0            | <b>376</b>   | mg/L  |       |



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**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/03/2017 11:40  
Analyzed: 14-Nov-2017 23:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 2        | 0.136           | 0.200           | ND     | ug/L  | U     |



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Reported:  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/03/2017 11:40  
Analyzed: 14-Nov-2017 23:37

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 2        | 0.0440          | 0.400           | <b>1.26</b> | ug/L  | D     |
| Copper, Dissolved  | 7440-50-8  | 2        | 0.680           | 1.00            | ND          | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 2        | 0.100           | 1.00            | <b>5.53</b> | ug/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/03/2017 11:40  
Analyzed: 08-Nov-2017 14:54

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0133 Sample Size: 20 mL  
Prepared: 06-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 11:40  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 50 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Solids |            | 1        | 20.0            | <b>1690</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 11:40  
Analyzed: 04-Nov-2017 21:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118  
Prepared: 03-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 5        | 0.500           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 5        | 0.500           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units  | Notes |
|-----------------|------------|----------|-----------------|-------------|--------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 0.50            | <b>0.69</b> | mg-P/L | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 0.500           | <b>1.14</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/03/2017 11:40

Instrument: Accumet AR60

Analyzed: 06-Nov-2017 14:59

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 302    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 302    | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 11:40  
Analyzed: 19-Nov-2017 00:09

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.65</b> | mg/L  | D     |



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**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 11:40  
Analyzed: 12-Nov-2017 07:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 5        | 0.500           | <b>2.83</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**GW-1C1-3-110317-(20)**  
**17K0066-20RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 11:40  
Analyzed: 15-Nov-2017 00:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|----------|------------|----------|-----------------|------------|-------|-------|
| Chloride | 16887-00-6 | 500      | 50.0            | <b>876</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**EB-110317**  
**17K0066-21 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/03/2017 14:30  
Analyzed: 13-Nov-2017 14:49

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0347 Sample Size: 10 mL  
Prepared: 13-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units  | Notes |
|--|------------|----------|-----------------|-----------------|-------------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND          | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | <b>0.06</b> | ug/L   | J     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND          | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 %    | 105 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 %    | 97.0 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 %    | 97.6 % |       |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 %    | 101 %  |       |



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**Reported:**  
29-Nov-2017 13:45

**EB-110317**  
**17K0066-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/03/2017 14:30  
Analyzed: 16-Nov-2017 19:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0234 Sample Size: 25 mL  
Prepared: 09-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead    | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
29-Nov-2017 13:45

**EB-110317**  
**17K0066-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/03/2017 14:30  
Analyzed: 16-Nov-2017 19:52

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0234 Sample Size: 25 mL  
Prepared: 09-Nov-2017 Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0220          | 0.200           | <b>0.0840</b> | ug/L  | J     |
| Copper  | 7440-50-8  | 1        | 0.340           | 0.500           | ND            | ug/L  | U     |
| Nickel  | 7440-02-0  | 1        | 0.0500          | 0.500           | <b>0.208</b>  | ug/L  | J     |



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**Reported:**  
29-Nov-2017 13:45

**EB-110317**  
**17K0066-21 (Water)**

**Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/03/2017 14:30  
Analyzed: 08-Nov-2017 17:10

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0208 Sample Size: 20 mL  
Prepared: 08-Nov-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |





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Reported:  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 11/03/2017 14:30  
Analyzed: 10-Nov-2017 15:31

Sample Preparation: Preparation Method: WMN (No Prep)  
Preparation Batch: BFK0238  
Prepared: 09-Nov-2017

Sample Size: 25 mL  
Final Volume: 25 mL

| Analyte              | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum, Dissolved  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Calcium, Dissolved   | 7440-70-2  | 1        | 0.0051          | 0.0500          | ND            | mg/L  | U     |
| Iron, Dissolved      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0104</b> | mg/L  | J     |
| Magnesium, Dissolved | 7439-95-4  | 1        | 0.0160          | 0.0500          | ND            | mg/L  | U     |
| Manganese, Dissolved | 7439-96-5  | 1        | 0.0003          | 0.0010          | ND            | mg/L  | U     |
| Potassium, Dissolved | 7440-09-7  | 1        | 0.0520          | 0.500           | <b>0.0948</b> | mg/L  | J     |
| Silicon, Dissolved   | 7440-21-3  | 1        | 0.0052          | 0.0600          | ND            | mg/L  | U     |
| Sodium, Dissolved    | 7440-23-5  | 1        | 0.0114          | 0.500           | <b>0.109</b>  | mg/L  | J     |



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**Reported:**  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A  
Instrument: ICPMS2

Sampled: 11/03/2017 14:30  
Analyzed: 14-Nov-2017 19:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte         | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Lead, Dissolved | 7439-92-1  | 1        | 0.0680          | 0.100           | ND     | ug/L  | U     |



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Reported:  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED  
Instrument: ICPMS2

Sampled: 11/03/2017 14:30  
Analyzed: 14-Nov-2017 19:35

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BFK0325 Sample Size: 25 mL  
Prepared: 13-Nov-2017 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1        | 0.0220          | 0.200           | ND     | ug/L  | U     |
| Copper, Dissolved  | 7440-50-8  | 1        | 0.340           | 0.500           | ND     | ug/L  | U     |
| Nickel, Dissolved  | 7440-02-0  | 1        | 0.0500          | 0.500           | ND     | ug/L  | U     |



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**Reported:**  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 11/03/2017 14:30  
Analyzed: 08-Nov-2017 14:55

Sample Preparation: Preparation Method: TWM EPA 7470A  
Preparation Batch: BFK0133 Sample Size: 20 mL  
Prepared: 06-Nov-2017 Final Volume: 20 mL

| Analyte            | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|--------|-------|-------|
| Mercury, Dissolved | 7439-97-6  | 1        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/03/2017 14:30  
Analyzed: 07-Nov-2017 07:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0167 Sample Size: 200 mL  
Prepared: 07-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Dissolved Solids |            | 1        | 5.0             | <b>5.5</b> | mg/L  |       |



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**Reported:**  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 14:30  
Analyzed: 04-Nov-2017 21:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Chloride | 16887-00-6 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



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**Reported:**  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/03/2017 14:30

Instrument: Accumet AR60

Analyzed: 06-Nov-2017 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0157  
Prepared: 06-Nov-2017

Sample Size: 100 mL  
Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |



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**Reported:**  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/03/2017 14:30  
Analyzed: 19-Nov-2017 00:38

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0433 Sample Size: 20 mL  
Prepared: 15-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 1        | 0.50            | ND     | mg/L  | U     |





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**Reported:**  
29-Nov-2017 13:45

**EB-110317-(20)**  
**17K0066-22RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/03/2017 14:30  
Analyzed: 12-Nov-2017 08:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0118 Sample Size: 5 mL  
Prepared: 03-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |



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Reported:  
29-Nov-2017 13:45

**TB**  
**17K0066-23 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT3

Sampled: 11/03/2017 00:00  
Analyzed: 13-Nov-2017 13:59

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0347 Sample Size: 10 mL  
Prepared: 13-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 106   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 100   | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 101   | %     |



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Reported:  
29-Nov-2017 13:45

### Volatile Organic Compounds - Quality Control

#### Batch BFK0296 - EPA 5030 (Purge and Trap)

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0296-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 11:40 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 5.36   |                 |                 | ug/L  | 5.00        |   | 107  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.93   |                 |                 | ug/L  | 5.00        |   | 98.6 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.81   |                 |                 | ug/L  | 5.00        |   | 96.2 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| <b>LCS (BFK0296-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 09:33 |      |             |      |           |       |
| Vinyl Chloride                    | 9.67   | 0.06            | 0.20            | ug/L  | 10.0        |   | 96.7 | 66-133      |      |           |       |
| Chloroform                        | 9.75   | 0.03            | 0.20            | ug/L  | 10.0        |   | 97.5 | 80-122      |      |           |       |
| Trichloroethene                   | 9.74   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.4 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.61   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.1 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.92   |                 |                 | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.91   |                 |                 | ug/L  | 5.00        |   | 98.3 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 5.05   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.84   |                 |                 | ug/L  | 5.00        |   | 96.7 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0296-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 09:58 |      |             |      |           |       |
| Vinyl Chloride                    | 9.84   | 0.06            | 0.20            | ug/L  | 10.0        |   | 98.4 | 66-133      | 1.71 | 30        |       |
| Chloroform                        | 9.83   | 0.03            | 0.20            | ug/L  | 10.0        |   | 98.3 | 80-122      | 0.86 | 30        |       |
| Trichloroethene                   | 9.66   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.6 | 80-120      | 0.85 | 30        |       |
| Tetrachloroethene                 | 9.47   | 0.05            | 0.20            | ug/L  | 10.0        |   | 94.7 | 80-120      | 1.52 | 30        |       |
| Surrogate: Dibromofluoromethane   | 5.07   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 5.20   |                 |                 | ug/L  | 5.00        |   | 104  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.96   |                 |                 | ug/L  | 5.00        |   | 99.1 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 5.08   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.93   |                 |                 | ug/L  | 5.00        |   | 98.7 | 80-120      |      |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**Volatile Organic Compounds - Quality Control**

**Batch BFK0304 - EPA 5030 (Purge and Trap)**

Instrument: NT2 Analyst: PB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0304-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 11:44 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 5.52   |                 |                 | ug/L  | 5.00        |   | 110  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.74   |                 |                 | ug/L  | 5.00        |   | 94.8 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.23   |                 |                 | ug/L  | 5.00        |   | 84.6 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.27   |                 |                 | ug/L  | 5.00        |   | 105  | 80-120      |      |           |       |
| <b>LCS (BFK0304-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 10:47 |      |             |      |           |       |
| Vinyl Chloride                    | 10.8   | 0.06            | 0.20            | ug/L  | 10.0        |   | 108  | 66-133      |      |           |       |
| Chloroform                        | 10.2   | 0.03            | 0.20            | ug/L  | 10.0        |   | 102  | 80-122      |      |           |       |
| Trichloroethene                   | 9.86   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.6 | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 5.17   |                 |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.66   |                 |                 | ug/L  | 5.00        |   | 93.1 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.05   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.88   |                 |                 | ug/L  | 5.00        |   | 97.6 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.01   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| <b>LCS Dup (BFK0304-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 10-Nov-2017 Analyzed: 10-Nov-2017 11:24 |      |             |      |           |       |
| Vinyl Chloride                    | 10.9   | 0.06            | 0.20            | ug/L  | 10.0        |   | 109  | 66-133      | 0.99 | 30        |       |
| Chloroform                        | 10.3   | 0.03            | 0.20            | ug/L  | 10.0        |   | 103  | 80-122      | 0.96 | 30        |       |
| Trichloroethene                   | 9.84   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.4 | 80-120      | 0.26 | 30        |       |
| Tetrachloroethene                 | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      | 0.84 | 30        |       |
| Surrogate: Dibromofluoromethane   | 5.00   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.64   |                 |                 | ug/L  | 5.00        |   | 92.7 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.12   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.83   |                 |                 | ug/L  | 5.00        |   | 96.6 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.98   |                 |                 | ug/L  | 5.00        |   | 99.7 | 80-120      |      |           |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**Volatile Organic Compounds - Quality Control**

**Batch BFK0347 - EPA 5030 (Purge and Trap)**

Instrument: NT3 Analyst: PC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0347-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 13-Nov-2017 Analyzed: 13-Nov-2017 12:43 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 5.07   |                 |                 | ug/L  | 5.00        |   | 101  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.93   |                 |                 | ug/L  | 5.00        |   | 98.7 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.90   |                 |                 | ug/L  | 5.00        |   | 98.1 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.04   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS (BFK0347-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 13-Nov-2017 Analyzed: 13-Nov-2017 10:35 |      |             |      |           |       |
| Vinyl Chloride                    | 10.2   | 0.06            | 0.20            | ug/L  | 10.0        |   | 102  | 66-133      |      |           |       |
| Chloroform                        | 10.1   | 0.03            | 0.20            | ug/L  | 10.0        |   | 101  | 80-122      |      |           |       |
| Trichloroethene                   | 9.89   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.9 | 80-120      |      |           |       |
| Tetrachloroethene                 | 9.81   | 0.05            | 0.20            | ug/L  | 10.0        |   | 98.1 | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 5.10   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 5.01   |                 |                 | ug/L  | 5.00        |   | 100  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.08   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 5.06   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.03   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| <b>LCS Dup (BFK0347-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 13-Nov-2017 Analyzed: 13-Nov-2017 11:01 |      |             |      |           |       |
| Vinyl Chloride                    | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      | 0.97 | 30        |       |
| Chloroform                        | 10.1   | 0.03            | 0.20            | ug/L  | 10.0        |   | 101  | 80-122      | 0.45 | 30        |       |
| Trichloroethene                   | 9.93   | 0.05            | 0.20            | ug/L  | 10.0        |   | 99.3 | 80-120      | 0.33 | 30        |       |
| Tetrachloroethene                 | 9.74   | 0.05            | 0.20            | ug/L  | 10.0        |   | 97.4 | 80-120      | 0.70 | 30        |       |
| Surrogate: Dibromofluoromethane   | 5.07   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.91   |                 |                 | ug/L  | 5.00        |   | 98.2 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.01   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.89   |                 |                 | ug/L  | 5.00        |   | 97.9 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.16   |                 |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0208 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0208-BLK1)</b> |         |                 |       |             | Prepared: 08-Nov-2017 Analyzed: 08-Nov-2017 16:38 |      |             |     |           |       |
| Mercury                     | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0208-BS1)</b>    |         |                 |       |             | Prepared: 08-Nov-2017 Analyzed: 08-Nov-2017 16:46 |      |             |     |           |       |
| Mercury                     | 0.00222 | 0.000100        | mg/L  | 0.00200     |   | 111  | 80-120      |     |           |       |



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Reported:  
29-Nov-2017 13:45

**Metals and Metallic Compounds - Quality Control**

**Batch BFK0234 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0234-BLK1)</b> |         |        |                 |                 |       | Prepared: 09-Nov-2017 Analyzed: 16-Nov-2017 20:23 |               |      |             |     |           |       |
| Lead                        | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic                     | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper                      | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel                      | 60      | 0.0520 | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | J     |
| Nickel                      | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0234-BS1)</b>    |         |        |                 |                 |       | Prepared: 09-Nov-2017 Analyzed: 16-Nov-2017 20:44 |               |      |             |     |           |       |
| Lead                        | 208     | 27.2   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 109  | 80-120      |     |           |       |
| Arsenic                     | 75a     | 28.2   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 113  | 80-120      |     |           |       |
| Copper                      | 63      | 27.2   | 0.340           | 0.500           | ug/L  | 25.0  |               | 109  | 80-120      |     |           |       |
| Copper                      | 65      | 27.4   | 0.350           | 0.500           | ug/L  | 25.0  |               | 110  | 80-120      |     |           |       |
| Nickel                      | 60      | 26.8   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 107  | 80-120      |     |           |       |
| Nickel                      | 62      | 26.7   | 0.220           | 0.500           | ug/L  | 25.0  |               | 107  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0133 - TWM EPA 7470A**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result  | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0133-BLK1)</b> |         |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:33 |      |             |     |           |       |
| Mercury, Dissolved          | ND      | 0.000100        | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0133-BS1)</b>    |         |                 |       |             | Prepared: 06-Nov-2017 Analyzed: 08-Nov-2017 14:35 |      |             |     |           |       |
| Mercury, Dissolved          | 0.00229 | 0.000100        | mg/L  | 0.00200     |   | 115  | 80-120      |     |           |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0238 - WMN (No Prep)**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0238-BLK1)</b> |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 14:05 |      |             |     |           |       |
| Aluminum, Dissolved         | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Calcium, Dissolved          | ND     | 0.0051          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Magnesium, Dissolved        | ND     | 0.0160          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Potassium, Dissolved        | ND     | 0.0520          | 0.500           | mg/L  |             |   |      |             |     |           | U     |
| Silicon, Dissolved          | ND     | 0.0052          | 0.0600          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0722 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |
| <b>Blank (BFK0238-BLK2)</b> |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 13-Nov-2017 11:57 |      |             |     |           |       |
| Iron, Dissolved             | 0.0088 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Manganese, Dissolved        | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| Sodium, Dissolved           | 0.0126 | 0.0114          | 0.500           | mg/L  |             |   |      |             |     |           | J     |
| Sodium, Dissolved           | ND     | 1.90            | 50.0            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFK0238-BS1)</b>    |        |                 |                 |       |             | Prepared: 09-Nov-2017 Analyzed: 10-Nov-2017 13:40 |      |             |     |           |       |
| Aluminum, Dissolved         | 2.05   | 0.0085          | 0.0500          | mg/L  | 2.00        |   | 103  | 80-120      |     |           |       |
| Calcium, Dissolved          | 9.82   | 0.0051          | 0.0500          | mg/L  | 10.0        |   | 98.2 | 80-120      |     |           |       |
| Iron, Dissolved             | 1.96   | 0.0013          | 0.0500          | mg/L  | 2.00        |   | 98.0 | 80-120      |     |           |       |
| Magnesium, Dissolved        | 10.4   | 0.0160          | 0.0500          | mg/L  | 10.0        |   | 104  | 80-120      |     |           |       |
| Manganese, Dissolved        | 0.468  | 0.0003          | 0.0010          | mg/L  | 0.500       |   | 93.6 | 80-120      |     |           |       |
| Potassium, Dissolved        | 9.40   | 0.0520          | 0.500           | mg/L  | 10.0        |   | 94.0 | 80-120      |     |           |       |
| Silicon, Dissolved          | 9.72   | 0.0052          | 0.0600          | mg/L  | 10.0        |   | 97.2 | 80-120      |     |           |       |
| Sodium, Dissolved           | 9.88   | 0.0114          | 0.500           | mg/L  | 10.0        |   | 98.8 | 80-120      |     |           |       |
| Sodium, Dissolved           | 10.1   | 1.90            | 50.0            | mg/L  | 10.0        |   | 101  | 80-120      |     |           | J     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BFK0325 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: CC

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0325-BLK1)</b> |         |        |                 |                 |       | Prepared: 13-Nov-2017 Analyzed: 13-Nov-2017 20:33 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | ND     | 0.0680          | 0.100           | ug/L  |   |               |      |             |     |           | U     |
| Arsenic, Dissolved          | 75a     | ND     | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 63      | ND     | 0.340           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Copper, Dissolved           | 65      | ND     | 0.350           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 60      | ND     | 0.0500          | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| Nickel, Dissolved           | 62      | ND     | 0.220           | 0.500           | ug/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFK0325-BS1)</b>    |         |        |                 |                 |       | Prepared: 13-Nov-2017 Analyzed: 13-Nov-2017 20:53 |               |      |             |     |           |       |
| Lead, Dissolved             | 208     | 28.4   | 0.0680          | 0.100           | ug/L  | 25.0  |               | 114  | 80-120      |     |           |       |
| Arsenic, Dissolved          | 75a     | 26.5   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 106  | 80-120      |     |           |       |
| Copper, Dissolved           | 63      | 26.7   | 0.340           | 0.500           | ug/L  | 25.0  |               | 107  | 80-120      |     |           |       |
| Copper, Dissolved           | 65      | 25.9   | 0.350           | 0.500           | ug/L  | 25.0  |               | 104  | 80-120      |     |           |       |
| Nickel, Dissolved           | 60      | 25.9   | 0.0500          | 0.500           | ug/L  | 25.0  |               | 103  | 80-120      |     |           |       |
| Nickel, Dissolved           | 62      | 25.4   | 0.220           | 0.500           | ug/L  | 25.0  |               | 102  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

Wet Chemistry - Quality Control

Batch BFK0118 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte               | Result | Reporting Limit   | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---|--------|-------------|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0118-BLK1)</b>     |        | Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 06:45                       |        |             |               |      |             |      |           |       |
| Chloride                        | ND     | 0.100   | mg/L   |             |               |      |             |      |           | U     |
| Fluoride                        | ND     | 0.100   | mg/L   |             |               |      |             |      |           | U     |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |             |               |      |             |      |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |             |               |      |             |      |           | U     |
| Orthophosphorus                 | ND     | 0.10  | mg-P/L |             |               |      |             |      |           | U     |
| Sulfate                         | ND     | 0.100   | mg/L   |             |               |      |             |      |           | U     |
| <b>Blank (BFK0118-BLK2)</b>     |        | Prepared: 03-Nov-2017 Analyzed: 12-Nov-2017 02:45                       |        |             |               |      |             |      |           |       |
| Bromide                         | ND     | 0.100   | mg/L   |             |               |      |             |      |           | U     |
| Fluoride                        | ND     | 0.100   | mg/L   |             |               |      |             |      |           | U     |
| <b>LCS (BFK0118-BS1)</b>        |        | Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 07:06                       |        |             |               |      |             |      |           |       |
| Chloride                        | 1.51   | 0.100   | mg/L   | 1.50        |               | 100  | 90-110      |      |           |       |
| Fluoride                        | 1.53   | 0.100   | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| Nitrate-N                       | 1.54   | 0.100   | mg-N/L | 1.50        |               | 103  | 90-110      |      |           |       |
| Nitrite-N                       | 1.57   | 0.100   | mg-N/L | 1.50        |               | 104  | 90-110      |      |           |       |
| Orthophosphorus                 | 1.42   | 0.10  | mg-P/L | 1.50        |               | 94.5 | 90-110      |      |           |       |
| Sulfate                         | 1.56   | 0.100   | mg/L   | 1.50        |               | 104  | 90-110      |      |           |       |
| <b>LCS (BFK0118-BS2)</b>        |        | Prepared: 03-Nov-2017 Analyzed: 12-Nov-2017 03:05                       |        |             |               |      |             |      |           |       |
| Bromide                         | 1.45   | 0.100   | mg/L   | 1.50        |               | 96.8 | 90-110      |      |           |       |
| Fluoride                        | 1.53   | 0.100   | mg/L   | 1.50        |               | 102  | 90-110      |      |           |       |
| <b>Duplicate (BFK0118-DUP2)</b> |        | Source: 17K0066-02RE1 Prepared: 03-Nov-2017 Analyzed: 04-Nov-2017 22:38 |        |             |               |      |             |      |           |       |
| Fluoride                        | 0.310  | 0.100   | mg/L   |             | 0.309         |      |             | 0.32 | 20        |       |
| Nitrate-N                       | ND     | 0.100   | mg-N/L |             | ND            |      |             |      |           | U     |
| Nitrite-N                       | ND     | 0.100   | mg-N/L |             | ND            |      |             |      |           | U     |
| Orthophosphorus                 | 0.53   | 0.10  | mg-P/L |             | 0.52          |      |             | 0.57 | 20        |       |
| <b>Duplicate (BFK0118-DUP3)</b> |        | Source: 17K0066-02RE2 Prepared: 03-Nov-2017 Analyzed: 12-Nov-2017 03:45 |        |             |               |      |             |      |           |       |
| Bromide                         | 0.114  | 0.100   | mg/L   |             | 0.114         |      |             | 0.00 |           |       |
| <b>Duplicate (BFK0118-DUP4)</b> |        | Source: 17K0066-02RE3 Prepared: 03-Nov-2017 Analyzed: 14-Nov-2017 17:37 |        |             |               |      |             |      |           |       |
| Sulfate                         | 16.5   | 1.00  | mg/L   |             | 16.5          |      |             | 0.26 | 20        | D     |
| <b>Duplicate (BFK0118-DUP5)</b> |        | Source: 17K0066-02RE4 Prepared: 03-Nov-2017 Analyzed: 14-Nov-2017 20:18 |        |             |               |      |             |      |           |       |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
29-Nov-2017 13:45

Wet Chemistry - Quality Control

Batch BFK0118 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit              | Units  | Spike Level           | Source Result | %REC                        | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|------------------------------|--------|-----------------------|---------------|-----------------------------|-------------|------|-----------|-------|
| <b>Duplicate (BFK0118-DUP5)</b>   |        | <b>Source: 17K0066-02RE4</b> |        | Prepared: 03-Nov-2017 |               | Analyzed: 14-Nov-2017 20:18 |             |      |           |       |
| Chloride                          | 136    | 20.0                         | mg/L   |                       | 138           |                             |             | 1.01 | 20        | D     |
| <b>Matrix Spike (BFK0118-MS2)</b> |        | <b>Source: 17K0066-02RE1</b> |        | Prepared: 03-Nov-2017 |               | Analyzed: 04-Nov-2017 22:59 |             |      |           |       |
| Fluoride                          | 2.45   | 0.100                        | mg/L   | 2.00                  | 0.309         | 107                         | 75-125      |      |           |       |
| Nitrate-N                         | 2.14   | 0.100                        | mg-N/L | 2.00                  | ND            | 107                         | 75-125      |      |           |       |
| Nitrite-N                         | 1.99   | 0.100                        | mg-N/L | 2.00                  | ND            | 99.4                        | 75-125      |      |           |       |
| Orthophosphorus                   | 2.60   | 0.10                         | mg-P/L | 2.00                  | 0.52          | 104                         | 75-125      |      |           | E     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                              |      |                       |       |                             |        |  |  |   |
|-----------------------------------|------|------------------------------|------|-----------------------|-------|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFK0118-MS3)</b> |      | <b>Source: 17K0066-02RE2</b> |      | Prepared: 03-Nov-2017 |       | Analyzed: 12-Nov-2017 04:05 |        |  |  |   |
| Bromide                           | 1.98 | 0.200                        | mg/L | 2.00                  | 0.114 | 98.9                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |      |                              |      |                       |      |                             |        |  |  |   |
|-----------------------------------|------|------------------------------|------|-----------------------|------|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFK0118-MS4)</b> |      | <b>Source: 17K0066-02RE3</b> |      | Prepared: 03-Nov-2017 |      | Analyzed: 14-Nov-2017 17:57 |        |  |  |   |
| Sulfate                           | 35.1 | 2.00                         | mg/L | 20.0                  | 16.5 | 92.8                        | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                   |     |                              |      |                       |     |                             |        |  |  |   |
|-----------------------------------|-----|------------------------------|------|-----------------------|-----|-----------------------------|--------|--|--|---|
| <b>Matrix Spike (BFK0118-MS6)</b> |     | <b>Source: 17K0066-02RE4</b> |      | Prepared: 03-Nov-2017 |     | Analyzed: 15-Nov-2017 13:16 |        |  |  |   |
| Chloride                          | 391 | 50.0                         | mg/L | 250                   | 138 | 101                         | 75-125 |  |  | D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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**Reported:**  
29-Nov-2017 13:45

**Wet Chemistry - Quality Control**

**Batch BFK0157 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level | Source Result | %REC | %REC Limits  | RPD | RPD Limit | Notes |
|---------------------------------|--------|---|------------|-------------|---------------|------|--------------|-----|-----------|-------|
| <b>Blank (BFK0157-BLK1)</b>     |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 14:59 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| <b>Blank (BFK0157-BLK2)</b>     |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 17:15 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |             |               |      |              |     |           | U     |
| <b>Reference (BFK0157-SRM1)</b> |        | Prepared: 06-Nov-2017 Analyzed: 06-Nov-2017 14:59 |            |             |               |      |              |     |           |       |
| Alkalinity, Total               | 107    | 1.00  | mg/L CaCO3 | 108         |               | 99.0 | 30.37-108.33 |     |           |       |



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**Reported:**  
29-Nov-2017 13:45

**Wet Chemistry - Quality Control**

**Batch BFK0167 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|-------|-----------|-------|
| <b>Blank (BFK0167-BLK1)</b>     |        |                           |       |             |   |      |             |       |           |       |
|                                 |        |                           |       |             | Prepared: 07-Nov-2017 Analyzed: 07-Nov-2017 07:36 |      |             |       |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |       |           | U     |
| <b>LCS (BFK0167-BS1)</b>        |        |                           |       |             |   |      |             |       |           |       |
|                                 |        |                           |       |             | Prepared: 07-Nov-2017 Analyzed: 07-Nov-2017 07:36 |      |             |       |           |       |
| Dissolved Solids                | 504    | 5.0                       | mg/L  | 500         |   | 101  | 90-110      |       |           |       |
| <b>Duplicate (BFK0167-DUP1)</b> |        |                           |       |             |   |      |             |       |           |       |
|                                 |        | <b>Source: 17K0066-04</b> |       |             | Prepared: 07-Nov-2017 Analyzed: 07-Nov-2017 07:36 |      |             |       |           |       |
| Dissolved Solids                | 17400  | 200                       | mg/L  |             | 15500   |      |             | 11.70 | 20        |       |



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Reported:  
29-Nov-2017 13:45

### Wet Chemistry - Quality Control

#### Batch BFK0433 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: KK

| QC Sample/Analyte                   | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-------------------------------------|--------|---|-------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFK0433-BLK1)</b>         |        | Prepared: 15-Nov-2017 Analyzed: 18-Nov-2017 16:35 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 0.50  | mg/L  |   |               |      |             |      |           | U     |
| <b>LCS (BFK0433-BS1)</b>            |        | Prepared: 15-Nov-2017 Analyzed: 18-Nov-2017 16:59 |       |   |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 19.8   | 1.00  | mg/L  | 20.0  |               | 98.9 | 90-110      |      |           | D     |
| <b>Duplicate (BFK0433-DUP1)</b>     |        | <b>Source: 17K0066-02</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 18-Nov-2017 18:56 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 4.87   | 1.00  | mg/L  |   | 4.77          |      |             | 2.12 | 20        | D     |
| <b>Matrix Spike (BFK0433-MS1)</b>   |        | <b>Source: 17K0066-02</b>                         |       | Prepared: 15-Nov-2017 Analyzed: 18-Nov-2017 19:17 |               |      |             |      |           |       |
| Dissolved Organic Carbon, Dissolved | 24.9   | 1.00  | mg/L  | 20.0  | 4.77          | 101  | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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29-Nov-2017 13:45

**Certified Analyses included in this Report**

| Analyte                           | Certifications                  |
|-----------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>         |                                 |
| Bromide                           | DoD-ELAP,WADOE,NELAP            |
| Chloride                          | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                          | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                         | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                   | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                           | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 6010C in Water</b>         |                                 |
| Aluminum                          | WADOE,NELAP                     |
| Calcium                           | WADOE,NELAP                     |
| Iron                              | WADOE,NELAP                     |
| Potassium                         | WADOE,NELAP                     |
| Magnesium                         | WADOE,NELAP                     |
| Manganese                         | WADOE,NELAP                     |
| Sodium                            | WADOE,NELAP                     |
| <b>EPA 6020A in Water</b>         |                                 |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| Lead-208                          | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 6020A UCT-KED in Water</b> |                                 |
| Arsenic-75a                       | WADOE,WA-DW,DoD-ELAP,ADEC,NELAP |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC       |
| Copper-63                         | NELAP,WADOE,DoD-ELAP            |
| Copper-65                         | NELAP,WADOE,DoD-ELAP            |
| Nickel-60                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| Nickel-62                         | NELAP,WADOE,DoD-ELAP,ADEC       |
| <b>EPA 7470A in Water</b>         |                                 |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| Mercury                           | WADOE,NELAP,DoD-ELAP,CALAP      |
| <b>EPA 8260C in Water</b>         |                                 |
| Chloromethane                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |





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|                                       |                                 |
|---------------------------------------|---------------------------------|
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichloroethene                       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



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|                             |                                 |
|-----------------------------|---------------------------------|
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,4-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                    | WADOE                           |
| 2-Pentanone                 | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
29-Nov-2017 13:45

**SM 5310 B-00 in Water**

Dissolved Organic Carbon

WADOE,WA-DW,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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**Reported:**  
29-Nov-2017 13:45

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



04 December 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17K0256

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

|   |                               |
|---|-------------------------------|
| ARI Assigned Number: <i>17336</i>   | Turn-around Requested: Normal |
| ARI Client Company: Pioneer Technologies<br>Client Contact: Troy Bussey (busseyt@uspioneer.com) | Date: 11.15.17                |
| Client Project Name: Arkema FS DG Inv<br>Client Project #: 79227                                | Page: 1 of 3                  |
| Samplers: D Cooper 206-660-3466<br>T Dreher / L Kerner / D Pickering                            | No. of Coolers:<br>Temp(s):   |



Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)

| Sample ID  | Date  | Time | Matrix | No. Containers | Analysis Requested                             |  |  |                                   |                         | Notes/Comments |  |
|--|---|------|--------|----------------|--|--|--|-----------------------------------|-------------------------|----------------|--|
|  |   |      |        |                | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Nitrate, Nitrite EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B |                |  |
| EB-111517  | 11-15-17  | 845  | Water  | 2              | X  |  |  |                                   |                         |                |  |
| EB-111517-(20)   | 11-15-17  | 845  |        | 3              |  | X  |  | X                                 |                         |                |  |
| PW-120+75-ST1-DS-111517  |   | 1005 |        | 2              | X  |  |  |                                   |                         |                |  |
| PW-120+75-ST1-DS-111517-(20)   |   | 1005 |        | 3              |  | X  |  | X                                 |                         |                |  |
| PW-120+75-SW-111517  |   | 1030 |        | 2              | X  |  |  |                                   |                         |                |  |
| PW-120+75-SW-111517-(20)   |   | 1030 |        | 3              |  | X  |  | X                                 |                         |                |  |
| PW-122+60-0-DS-111517  |   | 1105 |        | 2              | X  |  |  |                                   |                         |                |  |
| PW-122+60-0-DS-111517-(20)   |   | 1105 |        | 3              |  | X  |  | X                                 |                         |                |  |
| PW-124+60-0-DS-111517  |   | 1200 |        | 2              | X  |  |  |                                   |                         |                |  |
| PW-124+60-0-DS-111517-(20)   |   | 1200 |        | 3              |  | X  |  | X                                 |                         |                |  |
| PW-125+60-ST1-DS-111517  |   | 1230 |        | 2              | X  |  |  |                                   |                         |                |  |
| Comments/Special Instructions  | Relinquished by: (Signature) <i>T. Dreher</i><br>Relinquished by: (Signature) <i>David Walker</i><br>Printed Name: <i>David Walker</i><br>Printed Name: <i>David Walker</i><br>Company: <i>ARI</i><br>Company: <i>ARI</i><br>Date & Time: <i>11/15/2017 1700</i><br>Date & Time: <i>11/15/2017 1700</i> |      |        |                |  |  |  |                                   |                         |                |  |
| Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by: (Signature)<br>Relinquished by: (Signature)<br>Printed Name:<br>Printed Name:<br>Company:<br>Company:<br>Date & Time:<br>Date & Time:  |      |        |                |  |  |  |                                   |                         |                |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 17K0256 Turn-around Requested: Normal

ARI Client Company: Pioneer Technologies Phone: 360-570-1700

Client Contact: Troy Bussey (busseyt@uspioneer.com)

Client Project Name: Arkema FS DG Inv

Client Project #: 79227 Samplers: D Cooper 206-660-3466  
T Dreher / L Kerner / D Pickering

Date: 11-15-17

Page: 2 of 3

No. of Coolers: \_\_\_\_\_

No. of Tempis: \_\_\_\_\_

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



| Sample ID                     | Date  | Time | Matrix | No. Containers | Analysis Requested  |   |   |                                      |  |  | Notes/Comments |  |  |  |  |  |  |  |  |  |   |  |
|-------------------------------|---|------|--------|----------------|---|---|---|--------------------------------------|--|--|----------------|--|--|--|--|--|--|--|--|--|---|--|
|                               |   |      |        |                | PCE, TCE, Vinyl chloride, Chloroform<br>EPA 8260C   | Dissolved Sulfate, Ortho-phosphorus, Bromide, Nitrate, Chloride, Fluoride, Nitrite<br>EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate<br>EPA 2320 | Dissolved TDS<br>SM 2540 C/EPA 160.1 | Dissolved DOC<br>SM 5310 B   |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-125+00-ST1-DS-111517-(20)  | 11-15-17  | 1230 | Water  | 3              | X   | X   | X   | X                                    | X  |  |                |  |  |  |  |  |  |  |  |  | All dissolved samples field filtered 0.45um |  |
| PW-125+00-SW-111517           |   | 1300 |        | 2              | X   |   |   |                                      |  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-125+00-SW-111517-(20)      |   | 1300 |        | 3              | X   | X   | X   | X                                    | X  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-125+50+0-DS-111517         |   | 1320 |        | 2              | X   |   |   |                                      |  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-125+50+0-DS-111517-(20)    |   | 1320 |        | 3              | X   | X   | X   | X                                    | X  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-126+90-0-DS-111517         |   | 1345 |        | 2              | X   |   |   |                                      |  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-126+90-0-DS-111517-(20)    |   | 1345 |        | 3              | X   | X   | X   | X                                    | X  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-128+30-0-DS-111517         |   | 1410 |        | 2              | X   |   |   |                                      |  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-128+30-0-DS-111517-(20)    |   | 1410 |        | 3              | X   | X   | X   | X                                    | X  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-128+50-ST1-DS-111517       |   | 1430 |        | 2              | X   |   |   |                                      |  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| PW-128+50-ST1-DS-111517-(20)  |   | 1430 |        | 3              | X   | X   | X   | X                                    | X  |  |                |  |  |  |  |  |  |  |  |  |   |  |
| Comments/Special Instructions | Relinquished by: <u>[Signature]</u><br>Printed Name: <u>Luke Brown</u><br>Company: <u>DOF</u><br>Date & Time: <u>11-15-17 17:00</u> |      |        |                | Relinquished by: <u>[Signature]</u><br>Printed Name: <u>Jacob Waker</u><br>Company: <u>ARI</u><br>Date & Time: <u>11/15/2017 1700</u> |   |   |                                      | Received by: <u>[Signature]</u><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____ |  |                |  |  |  |  |  |  |  |  |  |   |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

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### Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: 11.15.17  
 Page: 3 of 3  
 No. of Coolers:   
 Temps:   
 Analysis Requested

Turn-around Requested: Normal  
 Phone: 360-570-1700  
 Client Company: Pioneer Technologies  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: D Cooper 206-660-3466  
 T Dreher / L Kerner / D Pickering

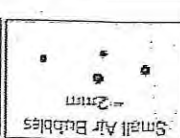
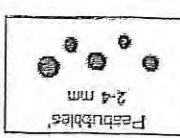
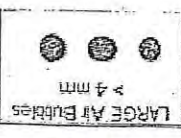
| Sample ID  | Date     | Time | Matrix | No. Containers | Analysis Requested   |  |                                   |                              |  |  | Notes/Comments               |  |                                   |                              |                              |                              |   |                              |
|--|----------|------|--------|----------------|--|--|-----------------------------------|------------------------------|--|--|------------------------------|--|-----------------------------------|------------------------------|------------------------------|------------------------------|---|------------------------------|
|  |          |      |        |                | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0 | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B      | PCE, TCE, Vinyl chloride, Chloroform EPA 8260C | Dissolved Sulfate, Ortho-phosphorus, Bromide, Chloride, Fluoride, Nitrate, Nitrite EPA 300.0 |                              | Dissolved Alkalinity as Carbonate and Bicarbonate EPA 2320 | Dissolved TDS SM 2540 C/EPA 160.1 | Dissolved DOC SM 5310 B      |                              |                              |   |                              |
| PW-128-50-SW-111517  | 11.15.17 | 1445 | water  | 2              | X  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              | All dissolved samples field filtered 0.45µm |                              |
| PW-128-50-SW-111517-(207)  | 11.15.17 | 1445 | ↓      | 3              | X  |  |                                   | X                            | X  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
|  |          |      |        |                |  |  |                                   |                              |  |  |                              |  |                                   |                              |                              |                              |   |                              |
| Comments/Special Instructions  |          |      |        |                | Received by: (Signature)   | Received by: (Signature)                                   | Relinquished by: (Signature)      | Relinquished by: (Signature) | Relinquished by: (Signature)                   | Relinquished by: (Signature)   | Relinquished by: (Signature) | Relinquished by: (Signature)                               | Relinquished by: (Signature)      | Relinquished by: (Signature) | Relinquished by: (Signature) | Relinquished by: (Signature) | Relinquished by: (Signature)                | Relinquished by: (Signature) |
| Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 |          |      |        |                | Printed Name: Luke Kerner  | Printed Name: Jacob Walker                                 | Printed Name: Jacob Walker        | Printed Name: Jacob Walker   | Printed Name: Jacob Walker                     | Printed Name: Jacob Walker   | Printed Name: Jacob Walker   | Printed Name: Jacob Walker                                 | Printed Name: Jacob Walker        | Printed Name: Jacob Walker   | Printed Name: Jacob Walker   | Printed Name: Jacob Walker   | Printed Name: Jacob Walker                  | Printed Name: Jacob Walker   |
|  |          |      |        |                | Company: POF   | Company: ARI   | Company: ARI                      | Company: ARI                 | Company: ARI                                   | Company: ARI   | Company: ARI                 | Company: ARI   | Company: ARI                      | Company: ARI                 | Company: ARI                 | Company: ARI                 | Company: ARI                                | Company: ARI                 |
|  |          |      |        |                | Date & Time: 11-15-17 1700   | Date & Time: 11/15/2017 1700                               | Date & Time: 11/15/2017 1700      | Date & Time: 11/15/2017 1700 | Date & Time: 11/15/2017 1700                   | Date & Time: 11/15/2017 1700   | Date & Time: 11/15/2017 1700 | Date & Time: 11/15/2017 1700                               | Date & Time: 11/15/2017 1700      | Date & Time: 11/15/2017 1700 | Date & Time: 11/15/2017 1700 | Date & Time: 11/15/2017 1700 | Date & Time: 11/15/2017 1700                | Date & Time: 11/15/2017 1700 |

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|                       |                                 |                            |                           |
|-----------------------|---------------------------------|----------------------------|---------------------------|
| Sample ID on Bottle   | Sample ID on COC                | Sample ID on Bottle        | Sample ID on COC          |
| Small → "sm" (< 2 mm) | Reabubbles → "pb" (2 to < 4 mm) | Large → "lg" (4 to < 6 mm) | Headspace → "hs" (< 6 mm) |

**Additional Notes, Discrepancies, & Resolutions:**  
 pw-125 + 00-SW - 11/15/2017, material broken  
 Small 0.5 for (B-1115-17-C20) missing the - (20) on label  
 VOCs in 11 air bubbles marked on pres sheet  
 By: SBR Date: 11/15/2017

Was a temperature blank included in the cooler?  YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper Other:  YES  NO

Were all bottles sealed in individual plastic bags?  YES  NO

Did all bottles arrive in good condition (unbroken)?  YES  NO

Were all bottle labels complete and legible?  YES  NO

Did the number of containers listed on COC match with the number of containers received?  YES  NO

Did all bottle labels and tags agree with custody papers?  YES  NO

Were all bottles used correct for the requested analyses?  YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)  YES  NO

Were all VOC vials free of air bubbles?  YES  NO

Was sufficient amount of sample sent in each bottle?  YES  NO

Date VOC Trip Blank was made at ARI:  YES  NO

Was Sample Split by ARI:  YES  NO

Equipment: \_\_\_\_\_ Date/Time: \_\_\_\_\_

Samples Logged by: SBR Date: 11/15/2017 Time: 1730

\*\* Notify Project Manager of discrepancies or concerns \*\*

**Log-In Phase:**

Cooler Accepted by: SBR Date: 11/15/2017 Time: 1700

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 1700565

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry): 4.4

Time: 1700

Were custody papers properly filled out (ink, signed, etc.)  YES  NO

Were custody papers included with the cooler?  YES  NO

Were intact, properly signed and dated custody seals attached to the outside of to cooler?  YES  NO

ARI Client: Pioneer Technologies

COC No(s): NA

Assigned ARI Job No: 17K0256

Project Name: Arima ES DC Investigation

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Tracking No: \_\_\_\_\_

**Cooler Receipt Form**



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                    | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|------------------------------|---------------|--------|-------------------|-------------------|
| EB-111517                    | 17K0256-01    | Water  | 15-Nov-2017 08:45 | 15-Nov-2017 17:00 |
| EB-111517-(20)               | 17K0256-02    | Water  | 15-Nov-2017 08:45 | 15-Nov-2017 17:00 |
| PW-120+75-ST1-DS-111517      | 17K0256-03    | Water  | 15-Nov-2017 10:05 | 15-Nov-2017 17:00 |
| PW-120+75-ST1-DS-111517-(20) | 17K0256-04    | Water  | 15-Nov-2017 10:05 | 15-Nov-2017 17:00 |
| PW-120+75-SW-111517          | 17K0256-05    | Water  | 15-Nov-2017 10:30 | 15-Nov-2017 17:00 |
| PW-120+75-SW-111517-(20)     | 17K0256-06    | Water  | 15-Nov-2017 10:30 | 15-Nov-2017 17:00 |
| PW-122+60-0-DS-111517        | 17K0256-07    | Water  | 15-Nov-2017 11:05 | 15-Nov-2017 17:00 |
| PW-122+60-0-DS-111517-(20)   | 17K0256-08    | Water  | 15-Nov-2017 11:05 | 15-Nov-2017 17:00 |
| PW-124+00-0-DS-111517        | 17K0256-09    | Water  | 15-Nov-2017 12:00 | 15-Nov-2017 17:00 |
| PW-124+00-0-DS-111517-(20)   | 17K0256-10    | Water  | 15-Nov-2017 12:00 | 15-Nov-2017 17:00 |
| PW-125+00-ST1-DS-111517      | 17K0256-11    | Water  | 15-Nov-2017 12:30 | 15-Nov-2017 17:00 |
| PW-125+00-ST1-DS-111517-(20) | 17K0256-12    | Water  | 15-Nov-2017 12:30 | 15-Nov-2017 17:00 |
| PW-125+00-SW-111517          | 17K0256-13    | Water  | 15-Nov-2017 13:00 | 15-Nov-2017 17:00 |
| PW-125+00-SW-111517-(20)     | 17K0256-14    | Water  | 15-Nov-2017 13:00 | 15-Nov-2017 17:00 |
| PW-125+50-0-DS-111517        | 17K0256-15    | Water  | 15-Nov-2017 13:20 | 15-Nov-2017 17:00 |
| PW-125+50-0-DS-111517-(20)   | 17K0256-16    | Water  | 15-Nov-2017 13:20 | 15-Nov-2017 17:00 |
| PW-126+90-0-DS-111517        | 17K0256-17    | Water  | 15-Nov-2017 13:45 | 15-Nov-2017 17:00 |
| PW-126+90-0-DS-111517-(20)   | 17K0256-18    | Water  | 15-Nov-2017 13:45 | 15-Nov-2017 17:00 |
| PW-128+30-0-DS-111517        | 17K0256-19    | Water  | 15-Nov-2017 14:10 | 15-Nov-2017 17:00 |
| PW-128+30-0-DS-111517-(20)   | 17K0256-20    | Water  | 15-Nov-2017 14:10 | 15-Nov-2017 17:00 |
| PW-128+50-ST1-DS-111517      | 17K0256-21    | Water  | 15-Nov-2017 14:30 | 15-Nov-2017 17:00 |
| PW-128+50-ST1-DS-111517-(20) | 17K0256-22    | Water  | 15-Nov-2017 14:30 | 15-Nov-2017 17:00 |
| PW-128+50-SW-111517          | 17K0256-23    | Water  | 15-Nov-2017 14:45 | 15-Nov-2017 17:00 |
| PW-128+50-SW-111517-(20)     | 17K0256-24    | Water  | 15-Nov-2017 14:45 | 15-Nov-2017 17:00 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received November 15, 2017 under ARI workorder 17K0256. For details regarding sample receipt, please refer to the Cooler Receipt Form. Due to the salty nature of the samples many analysis needed dilutions, and multiple runs were reported.

### Volatiles - EPA Method SW8260C

The samples were run within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

Sample PW-128+30-0-DS-111517 has high surrogate percent recovery for 4-Bromofluorobenzene. All other sample surrogate percent recoveries were within control limits. No corrective action was taken.

There were no target compounds detected in the method blank.

The LCS/LCSD percent recoveries and RPD were within control limits.

### Anions - EPA Method 300.0

The samples were analyzed within the recommended holding times.

Due to matrix interference and failing calibrations O-Phos was not performed on the samples.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blanks.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample EB-111517-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.

### Alkalinity - Method SM2320

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blanks.

The SRM percent recovery were within control limits.

A duplicate was prepared in conjunction with sample EB-111517-(20). The duplicate RPD was within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**Total Dissolved Solids - EPA Method 160.1**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sampe PW-120+75-ST1-DS-111517-(20). The duplicate RPD was within QC limits.

**Dissolved Organic Carbon - Method SM5310**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

A matrix spike and duplicate were prepared in conjunction with sample EB-111517-(20). The matrix spike percent recovery and duplicate RPD were within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**EB-111517**  
**17K0256-01 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 08:45  
Analyzed: 20-Nov-2017 13:51

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 102   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 93.0  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 99.6  | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
04-Dec-2017 17:20

**EB-111517-(20)**  
**17K0256-02 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 08:45  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 200 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Solids |            | 1        | 5.0             | ND     | mg/L  | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**EB-111517-(20)**  
**17K0256-02 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 08:45  
Analyzed: 16-Nov-2017 13:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------|------------|----------|-----------------|-------------|-------|-------|
| Chloride | 16887-00-6 | 1        | 0.100           | <b>1.48</b> | mg/L  |       |

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 1        | 0.100           | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 1        | 0.100           | ND     | mg-N/L | U     |

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**EB-111517-(20)**  
**17K0256-02 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 08:45  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571 Sample Size: 100 mL  
Prepared: 20-Nov-2017 Final Volume: 100 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**EB-111517-(20)**  
**17K0256-02 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 08:45  
Analyzed: 21-Nov-2017 12:03

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-120+75-ST1-DS-111517**  
**17K0256-03 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 10:05  
Analyzed: 20-Nov-2017 14:11

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 113   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 98.1  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 106   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
04-Dec-2017 17:20

**PW-120+75-ST1-DS-111517-(20)**  
**17K0256-04 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 10:05  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26600</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-120+75-ST1-DS-111517-(20)**  
**17K0256-04 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 10:05  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 109    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 109    | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-ST1-DS-111517-(20)**  
**17K0256-04 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 10:05  
Analyzed: 21-Nov-2017 13:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>2.56</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
04-Dec-2017 17:20

**PW-120+75-ST1-DS-111517-(20)**  
**17K0256-04RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 10:05  
Analyzed: 16-Nov-2017 18:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-ST1-DS-111517-(20)**  
**17K0256-04RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 10:05  
Analyzed: 21-Nov-2017 15:58

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>54.3</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-ST1-DS-111517-(20)**  
**17K0256-04RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 10:05  
Analyzed: 22-Nov-2017 12:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2360</b> | mg/L  | D     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-ST1-DS-111517-(20)**  
**17K0256-04RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 10:05  
Analyzed: 22-Nov-2017 17:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>16300</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-120+75-SW-111517**  
**17K0256-05 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 10:30  
Analyzed: 20-Nov-2017 14:32

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 121   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 93.4  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-SW-111517-(20)**  
**17K0256-06 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 10:30  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>27500</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-120+75-SW-111517-(20)**  
**17K0256-06 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 10:30  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>102</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>102</b> | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-SW-111517-(20)**  
**17K0256-06 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 10:30  
Analyzed: 21-Nov-2017 14:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.56</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-SW-111517-(20)**  
**17K0256-06RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 10:30  
Analyzed: 16-Nov-2017 19:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-SW-111517-(20)**  
**17K0256-06RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 10:30  
Analyzed: 21-Nov-2017 16:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>55.3</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-SW-111517-(20)**  
**17K0256-06RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 10:30  
Analyzed: 22-Nov-2017 13:14

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2480</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-120+75-SW-111517-(20)**  
**17K0256-06RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 10:30  
Analyzed: 22-Nov-2017 17:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>17000</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-122+60-0-DS-111517**  
**17K0256-07 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 11:05  
Analyzed: 20-Nov-2017 14:52

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 113   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.2  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 102   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-122+60-0-DS-111517-(20)**  
**17K0256-08 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 11:05  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>21800</b> | mg/L  |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-122+60-0-DS-111517-(20)**  
**17K0256-08 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 11:05  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>139</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>139</b> | mg/L CaCO3 |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-122+60-0-DS-111517-(20)**  
**17K0256-08 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 11:05  
Analyzed: 21-Nov-2017 14:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-------------------------------------|------------|----------|-----------------|--------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | 3.25   | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-122+60-0-DS-111517-(20)**  
**17K0256-08RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 11:05  
Analyzed: 16-Nov-2017 19:23

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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**Reported:**  
04-Dec-2017 17:20

**PW-122+60-0-DS-111517-(20)**  
**17K0256-08RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 11:05  
Analyzed: 21-Nov-2017 16:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>43.9</b> | mg/L  | D     |



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**Reported:**  
04-Dec-2017 17:20

**PW-122+60-0-DS-111517-(20)**  
**17K0256-08RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 11:05  
Analyzed: 22-Nov-2017 13:34

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>1900</b> | mg/L  | D     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-122+60-0-DS-111517-(20)**  
**17K0256-08RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 11:05  
Analyzed: 22-Nov-2017 17:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>13300</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-124+00-0-DS-111517**  
**17K0256-09 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 12:00  
Analyzed: 20-Nov-2017 15:12

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 118   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 96.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.0  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-124+00-0-DS-111517-(20)**  
**17K0256-10 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 12:00  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>23500</b> | mg/L  |       |



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**Reported:**  
04-Dec-2017 17:20

**PW-124+00-0-DS-111517-(20)**  
**17K0256-10 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/15/2017 12:00

Instrument: Accumet AR60

Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>106</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>106</b> | mg/L CaCO3 |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-124+00-0-DS-111517-(20)**  
**17K0256-10 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 12:00  
Analyzed: 21-Nov-2017 15:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.95</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-124+00-0-DS-111517-(20)**  
**17K0256-10RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 12:00  
Analyzed: 16-Nov-2017 20:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-124+00-0-DS-111517-(20)**  
**17K0256-10RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 12:00  
Analyzed: 21-Nov-2017 16:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>48.4</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-124+00-0-DS-111517-(20)**  
**17K0256-10RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 12:00  
Analyzed: 22-Nov-2017 13:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2120</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-124+00-0-DS-111517-(20)**  
**17K0256-10RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 12:00  
Analyzed: 22-Nov-2017 18:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>14500</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-125+00-ST1-DS-111517**  
**17K0256-11 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 12:30  
Analyzed: 20-Nov-2017 15:32

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 119   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-125+00-ST1-DS-111517-(20)**  
**17K0256-12 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 12:30  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>27500</b> | mg/L  |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-125+00-ST1-DS-111517-(20)**  
**17K0256-12 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 12:30  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 111    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 111    | mg/L CaCO3 |       |



Pioneer Technologies Corporation  
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**Reported:**  
04-Dec-2017 17:20

**PW-125+00-ST1-DS-111517-(20)**  
**17K0256-12 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 12:30  
Analyzed: 21-Nov-2017 15:26

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.56</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-125+00-ST1-DS-111517-(20)**  
**17K0256-12RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 12:30  
Analyzed: 16-Nov-2017 20:44

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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Olympia WA, 98503

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**Reported:**  
04-Dec-2017 17:20

**PW-125+00-ST1-DS-111517-(20)**  
**17K0256-12RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 12:30  
Analyzed: 21-Nov-2017 17:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>55.6</b> | mg/L  | D     |



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**Reported:**  
04-Dec-2017 17:20

**PW-125+00-ST1-DS-111517-(20)**  
**17K0256-12RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 12:30  
Analyzed: 22-Nov-2017 14:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2450</b> | mg/L  | D     |





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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-125+00-ST1-DS-111517-(20)**  
**17K0256-12RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 12:30  
Analyzed: 22-Nov-2017 18:38

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>16800</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-125+00-SW-111517**  
**17K0256-13 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 13:00  
Analyzed: 17-Nov-2017 12:26

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0515 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 114   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 97.0  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.3  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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**Reported:**  
04-Dec-2017 17:20

**PW-125+00-SW-111517-(20)**  
**17K0256-14 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 13:00  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26300</b> | mg/L  |       |



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Reported:  
04-Dec-2017 17:20

**PW-125+00-SW-111517-(20)**  
**17K0256-14 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 13:00  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>102</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>102</b> | mg/L CaCO3 |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
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**Reported:**  
04-Dec-2017 17:20

**PW-125+00-SW-111517-(20)**  
**17K0256-14 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 13:00  
Analyzed: 21-Nov-2017 15:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.32</b> | mg/L  | D     |



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Reported:  
04-Dec-2017 17:20

**PW-125+00-SW-111517-(20)**  
**17K0256-14RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:00  
Analyzed: 16-Nov-2017 21:04

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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**Reported:**  
04-Dec-2017 17:20

**PW-125+00-SW-111517-(20)**  
**17K0256-14RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:00  
Analyzed: 21-Nov-2017 17:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>56.4</b> | mg/L  | D     |



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**Reported:**  
04-Dec-2017 17:20

**PW-125+00-SW-111517-(20)**  
**17K0256-14RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:00  
Analyzed: 22-Nov-2017 14:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2460</b> | mg/L  | D     |





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**Reported:**  
04-Dec-2017 17:20

**PW-125+00-SW-111517-(20)**  
**17K0256-14RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:00  
Analyzed: 22-Nov-2017 18:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>16900</b> | mg/L  | D     |



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Reported:  
04-Dec-2017 17:20

**PW-125+50-0-DS-111517**  
**17K0256-15 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 13:20  
Analyzed: 20-Nov-2017 15:52

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 111   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 93.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 106   | %     |



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**Reported:**  
04-Dec-2017 17:20

**PW-125+50-0-DS-111517-(20)**  
**17K0256-16 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 13:20  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>24400</b> | mg/L  |       |



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Reported:  
04-Dec-2017 17:20

**PW-125+50-0-DS-111517-(20)**  
**17K0256-16 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 13:20  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>105</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>105</b> | mg/L CaCO3 |       |



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**Reported:**  
04-Dec-2017 17:20

**PW-125+50-0-DS-111517-(20)**  
**17K0256-16 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 13:20  
Analyzed: 21-Nov-2017 16:22

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.78</b> | mg/L  | D     |



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**Reported:**  
04-Dec-2017 17:20

**PW-125+50-0-DS-111517-(20)**  
**17K0256-16RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:20  
Analyzed: 16-Nov-2017 21:24

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-125+50-0-DS-111517-(20)**  
**17K0256-16RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:20  
Analyzed: 21-Nov-2017 17:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>49.9</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-125+50-0-DS-111517-(20)**  
**17K0256-16RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:20  
Analyzed: 22-Nov-2017 14:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2220</b> | mg/L  | D     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-125+50-0-DS-111517-(20)**  
**17K0256-16RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:20  
Analyzed: 22-Nov-2017 19:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>15400</b> | mg/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-126+90-0-DS-111517**  
**17K0256-17 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 13:45  
Analyzed: 20-Nov-2017 16:13

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 119   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 95.6  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 96.8  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 103   | %     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-126+90-0-DS-111517-(20)**  
**17K0256-18 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 13:45  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>24200</b> | mg/L  |       |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-126+90-0-DS-111517-(20)**  
**17K0256-18 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97

Sampled: 11/15/2017 13:45

Instrument: Accumet AR60

Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
04-Dec-2017 17:20

**PW-126+90-0-DS-111517-(20)**  
**17K0256-18 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 13:45  
Analyzed: 21-Nov-2017 16:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.82</b> | mg/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-126+90-0-DS-111517-(20)**  
**17K0256-18RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:45  
Analyzed: 16-Nov-2017 21:45

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-126+90-0-DS-111517-(20)**  
**17K0256-18RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:45  
Analyzed: 21-Nov-2017 18:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>50.3</b> | mg/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-126+90-0-DS-111517-(20)**  
**17K0256-18RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:45  
Analyzed: 22-Nov-2017 15:13

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2280</b> | mg/L  | D     |





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Olympia WA, 98503

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**Reported:**  
04-Dec-2017 17:20

**PW-126+90-0-DS-111517-(20)**  
**17K0256-18RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 13:45  
Analyzed: 22-Nov-2017 19:36

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>15500</b> | mg/L  | D     |



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Olympia WA, 98503

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Reported:  
04-Dec-2017 17:20

**PW-128+30-0-DS-111517**  
**17K0256-19 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 14:10  
Analyzed: 20-Nov-2017 16:33

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units  | Notes |
|--|------------|----------|-----------------|-----------------|----------|--------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L   | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L   | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L   | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 119 %  |       |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 92.0 % |       |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 122 %  | *     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 105 %  |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
04-Dec-2017 17:20

**PW-128+30-0-DS-111517-(20)**  
**17K0256-20 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 14:10  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>23800</b> | mg/L  |       |



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**Reported:**  
04-Dec-2017 17:20

**PW-128+30-0-DS-111517-(20)**  
**17K0256-20 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 14:10  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>123</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>123</b> | mg/L CaCO3 |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
04-Dec-2017 17:20

**PW-128+30-0-DS-111517-(20)**  
**17K0256-20 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 14:10  
Analyzed: 21-Nov-2017 17:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.94</b> | mg/L  | D     |



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**Reported:**  
04-Dec-2017 17:20

**PW-128+30-0-DS-111517-(20)**  
**17K0256-20RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:10  
Analyzed: 16-Nov-2017 22:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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**Reported:**  
04-Dec-2017 17:20

**PW-128+30-0-DS-111517-(20)**  
**17K0256-20RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:10  
Analyzed: 21-Nov-2017 18:35

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | 47.7   | mg/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

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**Reported:**  
04-Dec-2017 17:20

**PW-128+30-0-DS-111517-(20)**  
**17K0256-20RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:10  
Analyzed: 22-Nov-2017 15:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2070</b> | mg/L  | D     |





Pioneer Technologies Corporation  
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Olympia WA, 98503

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**Reported:**  
04-Dec-2017 17:20

**PW-128+30-0-DS-111517-(20)**  
**17K0256-20RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:10  
Analyzed: 22-Nov-2017 19:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>14400</b> | mg/L  | D     |



Pioneer Technologies Corporation  
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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-128+50-ST1-DS-111517**  
**17K0256-21 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 14:30  
Analyzed: 20-Nov-2017 16:53

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 116   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 94.7  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 97.4  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-ST1-DS-111517-(20)**  
**17K0256-22 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 14:30  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>26700</b> | mg/L  |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
04-Dec-2017 17:20

**PW-128+50-ST1-DS-111517-(20)**  
**17K0256-22 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 14:30  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | 138    | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | 138    | mg/L CaCO3 |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-ST1-DS-111517-(20)**  
**17K0256-22 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 14:30  
Analyzed: 21-Nov-2017 18:27

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.67</b> | mg/L  | D     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-ST1-DS-111517-(20)**  
**17K0256-22RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:30  
Analyzed: 16-Nov-2017 22:25

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-128+50-ST1-DS-111517-(20)**  
**17K0256-22RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:30  
Analyzed: 21-Nov-2017 18:56

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>53.9</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-128+50-ST1-DS-111517-(20)**  
**17K0256-22RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:30  
Analyzed: 22-Nov-2017 15:53

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2380</b> | mg/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**PW-128+50-ST1-DS-111517-(20)**  
**17K0256-22RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:30  
Analyzed: 22-Nov-2017 20:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>16200</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**PW-128+50-SW-111517**  
**17K0256-23 (Water)**

**Volatile Organic Compounds**

Method: EPA 8260C  
Instrument: NT16

Sampled: 11/15/2017 14:45  
Analyzed: 20-Nov-2017 17:13

Sample Preparation: Preparation Method: EPA 5030 (Purge and Trap)  
Preparation Batch: BFK0517 Sample Size: 10 mL  
Prepared: 17-Nov-2017 Final Volume: 10 mL

| Analyte                                  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result   | Units | Notes |
|--|------------|----------|-----------------|-----------------|----------|-------|-------|
| Vinyl Chloride                           | 75-01-4    | 1        | 0.06            | 0.20            | ND       | ug/L  | U     |
| Chloroform                               | 67-66-3    | 1        | 0.03            | 0.20            | ND       | ug/L  | U     |
| Trichloroethene                          | 79-01-6    | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| Tetrachloroethene                        | 127-18-4   | 1        | 0.05            | 0.20            | ND       | ug/L  | U     |
| <i>Surrogate: 1,2-Dichloroethane-d4</i>  |            |          |                 |                 | 80-129 % | 119   | %     |
| <i>Surrogate: Toluene-d8</i>             |            |          |                 |                 | 80-120 % | 92.8  | %     |
| <i>Surrogate: 4-Bromofluorobenzene</i>   |            |          |                 |                 | 80-120 % | 98.7  | %     |
| <i>Surrogate: 1,2-Dichlorobenzene-d4</i> |            |          |                 |                 | 80-120 % | 104   | %     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-SW-111517-(20)**  
**17K0256-24 (Water)**

**Wet Chemistry**

Method: EPA 160.1  
Instrument: BAL2

Sampled: 11/15/2017 14:45  
Analyzed: 21-Nov-2017 08:06

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0591 Sample Size: 5 mL  
Prepared: 21-Nov-2017 Final Volume: 200 mL

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Dissolved Solids |            | 1        | 200             | <b>27900</b> | mg/L  |       |



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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-SW-111517-(20)**  
**17K0256-24 (Water)**

**Wet Chemistry**

Method: SM 2320 B-97  
Instrument: Accumet AR60

Sampled: 11/15/2017 14:45  
Analyzed: 20-Nov-2017 14:21

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0571  
Prepared: 20-Nov-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte                 | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Bicarbonate |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Carbonate |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units      | Notes |
|-----------------------|------------|----------|-----------------|--------|------------|-------|
| Alkalinity, Hydroxide |            | 1        | 1.00            | ND     | mg/L CaCO3 | U     |

| Analyte           | CAS Number | Dilution | Reporting Limit | Result     | Units      | Notes |
|-------------------|------------|----------|-----------------|------------|------------|-------|
| Alkalinity, Total |            | 1        | 1.00            | <b>103</b> | mg/L CaCO3 |       |



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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-SW-111517-(20)**  
**17K0256-24 (Water)**

**Wet Chemistry**

Method: SM 5310 B-00  
Instrument: TOC-LCSH

Sampled: 11/15/2017 14:45  
Analyzed: 21-Nov-2017 19:02

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0561 Sample Size: 20 mL  
Prepared: 20-Nov-2017 Final Volume: 20 mL

| Analyte                             | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-------------------------------------|------------|----------|-----------------|-------------|-------|-------|
| Dissolved Organic Carbon, Dissolved |            | 2        | 1.00            | <b>1.54</b> | mg/L  | D     |



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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-SW-111517-(20)**  
**17K0256-24RE1 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:45  
Analyzed: 16-Nov-2017 22:46

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469  
Prepared: 16-Nov-2017

Sample Size: 5 mL  
Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|--------|-------|-------|
| Fluoride | 16984-48-8 | 10       | 1.00            | ND     | mg/L  | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrate-N | 14797-55-8 | 10       | 1.00            | ND     | mg-N/L | U     |

| Analyte   | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------|------------|----------|-----------------|--------|--------|-------|
| Nitrite-N | 14797-65-0 | 10       | 1.00            | ND     | mg-N/L | U     |



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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-SW-111517-(20)**  
**17K0256-24RE2 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:45  
Analyzed: 21-Nov-2017 19:57

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Bromide | 24959-67-9 | 50       | 5.00            | <b>56.1</b> | mg/L  | D     |



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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-SW-111517-(20)**  
**17K0256-24RE3 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:45  
Analyzed: 22-Nov-2017 16:54

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 1000     | 100             | <b>2520</b> | mg/L  | D     |





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**Reported:**  
04-Dec-2017 17:20

**PW-128+50-SW-111517-(20)**  
**17K0256-24RE4 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 11/15/2017 14:45  
Analyzed: 22-Nov-2017 21:17

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFK0469 Sample Size: 5 mL  
Prepared: 16-Nov-2017 Final Volume: 5 mL

| Analyte  | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|----------|------------|----------|-----------------|--------------|-------|-------|
| Chloride | 16887-00-6 | 5000     | 500             | <b>17200</b> | mg/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**Volatile Organic Compounds - Quality Control**

**Batch BFK0515 - EPA 5030 (Purge and Trap)**

Instrument: NT16 Analyst: PB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0515-BLK2)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 17-Nov-2017 Analyzed: 17-Nov-2017 10:48 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 4.77   |                 |                 | ug/L  | 5.00        |   | 95.5 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.89   |                 |                 | ug/L  | 5.00        |   | 97.7 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.92   |                 |                 | ug/L  | 5.00        |   | 98.5 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.16   |                 |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| <b>LCS (BFK0515-BS2)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 17-Nov-2017 Analyzed: 17-Nov-2017 09:49 |      |             |      |           |       |
| Vinyl Chloride                    | 10.5   | 0.06            | 0.20            | ug/L  | 10.0        |   | 105  | 66-133      |      |           |       |
| Chloroform                        | 9.38   | 0.03            | 0.20            | ug/L  | 10.0        |   | 93.8 | 80-122      |      |           |       |
| Trichloroethene                   | 9.39   | 0.05            | 0.20            | ug/L  | 10.0        |   | 93.9 | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.1   | 0.05            | 0.20            | ug/L  | 10.0        |   | 101  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.90   |                 |                 | ug/L  | 5.00        |   | 98.1 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.73   |                 |                 | ug/L  | 5.00        |   | 94.6 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.19   |                 |                 | ug/L  | 5.00        |   | 104  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.95   |                 |                 | ug/L  | 5.00        |   | 99.1 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 4.88   |                 |                 | ug/L  | 5.00        |   | 97.6 | 80-120      |      |           |       |
| <b>LCS Dup (BFK0515-BSD2)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 17-Nov-2017 Analyzed: 17-Nov-2017 10:28 |      |             |      |           |       |
| Vinyl Chloride                    | 10.1   | 0.06            | 0.20            | ug/L  | 10.0        |   | 101  | 66-133      | 3.96 | 30        |       |
| Chloroform                        | 9.22   | 0.03            | 0.20            | ug/L  | 10.0        |   | 92.2 | 80-122      | 1.77 | 30        |       |
| Trichloroethene                   | 9.19   | 0.05            | 0.20            | ug/L  | 10.0        |   | 91.9 | 80-120      | 2.10 | 30        |       |
| Tetrachloroethene                 | 9.67   | 0.05            | 0.20            | ug/L  | 10.0        |   | 96.7 | 80-120      | 4.75 | 30        |       |
| Surrogate: Dibromofluoromethane   | 4.92   |                 |                 | ug/L  | 5.00        |   | 98.4 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.75   |                 |                 | ug/L  | 5.00        |   | 94.9 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.13   |                 |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 5.04   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.03   |                 |                 | ug/L  | 5.00        |   | 101  | 80-120      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**Volatile Organic Compounds - Quality Control**

**Batch BFK0517 - EPA 5030 (Purge and Trap)**

Instrument: NT16 Analyst: PB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0517-BLK1)</b>       |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 17-Nov-2017 Analyzed: 20-Nov-2017 12:22 |      |             |      |           |       |
| Vinyl Chloride                    | ND     | 0.06            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Chloroform                        | ND     | 0.03            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Trichloroethene                   | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Tetrachloroethene                 | ND     | 0.05            | 0.20            | ug/L  |             |   |      |             |      |           | U     |
| Surrogate: 1,2-Dichloroethane-d4  | 5.15   |                 |                 | ug/L  | 5.00        |   | 103  | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 4.80   |                 |                 | ug/L  | 5.00        |   | 96.0 | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.84   |                 |                 | ug/L  | 5.00        |   | 96.8 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.10   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| <b>LCS (BFK0517-BS1)</b>          |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 17-Nov-2017 Analyzed: 20-Nov-2017 11:09 |      |             |      |           |       |
| Vinyl Chloride                    | 10.2   | 0.06            | 0.20            | ug/L  | 10.0        |   | 102  | 66-133      |      |           |       |
| Chloroform                        | 9.48   | 0.03            | 0.20            | ug/L  | 10.0        |   | 94.8 | 80-122      |      |           |       |
| Trichloroethene                   | 9.56   | 0.05            | 0.20            | ug/L  | 10.0        |   | 95.6 | 80-120      |      |           |       |
| Tetrachloroethene                 | 10.2   | 0.05            | 0.20            | ug/L  | 10.0        |   | 102  | 80-120      |      |           |       |
| Surrogate: Dibromofluoromethane   | 4.90   |                 |                 | ug/L  | 5.00        |   | 98.0 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.60   |                 |                 | ug/L  | 5.00        |   | 92.1 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.16   |                 |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 4.96   |                 |                 | ug/L  | 5.00        |   | 99.2 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.14   |                 |                 | ug/L  | 5.00        |   | 103  | 80-120      |      |           |       |
| <b>LCS Dup (BFK0517-BSD1)</b>     |        |                 |                 |       |             |   |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 17-Nov-2017 Analyzed: 20-Nov-2017 12:02 |      |             |      |           |       |
| Vinyl Chloride                    | 10.4   | 0.06            | 0.20            | ug/L  | 10.0        |   | 104  | 66-133      | 2.02 | 30        |       |
| Chloroform                        | 9.64   | 0.03            | 0.20            | ug/L  | 10.0        |   | 96.4 | 80-122      | 1.66 | 30        |       |
| Trichloroethene                   | 9.42   | 0.05            | 0.20            | ug/L  | 10.0        |   | 94.2 | 80-120      | 1.49 | 30        |       |
| Tetrachloroethene                 | 10.4   | 0.05            | 0.20            | ug/L  | 10.0        |   | 104  | 80-120      | 1.83 | 30        |       |
| Surrogate: Dibromofluoromethane   | 4.99   |                 |                 | ug/L  | 5.00        |   | 99.9 | 80-120      |      |           |       |
| Surrogate: 1,2-Dichloroethane-d4  | 4.73   |                 |                 | ug/L  | 5.00        |   | 94.6 | 80-129      |      |           |       |
| Surrogate: Toluene-d8             | 5.24   |                 |                 | ug/L  | 5.00        |   | 105  | 80-120      |      |           |       |
| Surrogate: 4-Bromofluorobenzene   | 5.08   |                 |                 | ug/L  | 5.00        |   | 102  | 80-120      |      |           |       |
| Surrogate: 1,2-Dichlorobenzene-d4 | 5.02   |                 |                 | ug/L  | 5.00        |   | 100  | 80-120      |      |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

Wet Chemistry - Quality Control

Batch BFK0469 - No Prep Wet Chem

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit    | Units  | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|--------------------|--------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0469-BLK1)</b>       |        |                    |        |             |   |      |             |      |           |       |
|                                   |        |                    |        |             | Prepared: 16-Nov-2017 Analyzed: 16-Nov-2017 12:42 |      |             |      |           |       |
| Bromide                           | ND     | 0.100              | mg/L   |             |   |      |             |      |           | U     |
| Chloride                          | ND     | 0.100              | mg/L   |             |   |      |             |      |           | U     |
| Fluoride                          | ND     | 0.100              | mg/L   |             |   |      |             |      |           | U     |
| Nitrate-N                         | ND     | 0.100              | mg-N/L |             |   |      |             |      |           | U     |
| Nitrite-N                         | ND     | 0.100              | mg-N/L |             |   |      |             |      |           | U     |
| Orthophosphorus                   | ND     | 0.10               | mg-P/L |             |   |      |             |      |           | U     |
| Sulfate                           | ND     | 0.100              | mg/L   |             |   |      |             |      |           | U     |
| <b>LCS (BFK0469-BS1)</b>          |        |                    |        |             |   |      |             |      |           |       |
|                                   |        |                    |        |             | Prepared: 16-Nov-2017 Analyzed: 16-Nov-2017 13:01 |      |             |      |           |       |
| Bromide                           | 1.47   | 0.100              | mg/L   | 1.50        |   | 97.7 | 90-110      |      |           |       |
| Chloride                          | 1.46   | 0.100              | mg/L   | 1.50        |   | 97.5 | 90-110      |      |           |       |
| Fluoride                          | 1.53   | 0.100              | mg/L   | 1.50        |   | 102  | 90-110      |      |           |       |
| Nitrate-N                         | 1.52   | 0.100              | mg-N/L | 1.50        |   | 101  | 90-110      |      |           |       |
| Nitrite-N                         | 1.54   | 0.100              | mg-N/L | 1.50        |   | 102  | 90-110      |      |           |       |
| Orthophosphorus                   | 1.50   | 0.10               | mg-P/L | 1.50        |   | 99.9 | 90-110      |      |           |       |
| Sulfate                           | 1.50   | 0.100              | mg/L   | 1.50        |   | 100  | 90-110      |      |           |       |
| <b>Duplicate (BFK0469-DUP1)</b>   |        |                    |        |             |   |      |             |      |           |       |
|                                   |        | Source: 17K0256-02 |        |             | Prepared: 16-Nov-2017 Analyzed: 16-Nov-2017 13:40 |      |             |      |           |       |
| Bromide                           | ND     | 0.100              | mg/L   |             | ND  |      |             |      |           | U     |
| Chloride                          | 1.44   | 0.100              | mg/L   |             | 1.48  |      |             | 2.66 | 20        |       |
| Fluoride                          | ND     | 0.100              | mg/L   |             | ND  |      |             |      |           | U     |
| Nitrate-N                         | ND     | 0.100              | mg-N/L |             | ND  |      |             |      |           | U     |
| Nitrite-N                         | ND     | 0.100              | mg-N/L |             | ND  |      |             |      |           | U     |
| Orthophosphorus                   | ND     | 0.10               | mg-P/L |             | ND  |      |             |      |           | U     |
| Sulfate                           | ND     | 0.100              | mg/L   |             | ND  |      |             |      |           | U     |
| <b>Matrix Spike (BFK0469-MS1)</b> |        |                    |        |             |   |      |             |      |           |       |
|                                   |        | Source: 17K0256-02 |        |             | Prepared: 16-Nov-2017 Analyzed: 16-Nov-2017 14:00 |      |             |      |           |       |
| Bromide                           | 2.07   | 0.100              | mg/L   | 2.00        | ND  | 103  | 75-125      |      |           |       |
| Chloride                          | 3.47   | 0.100              | mg/L   | 2.00        | 1.48  | 99.1 | 75-125      |      |           |       |
| Fluoride                          | 2.12   | 0.100              | mg/L   | 2.00        | ND  | 106  | 75-125      |      |           |       |
| Nitrate-N                         | 2.07   | 0.100              | mg-N/L | 2.00        | ND  | 104  | 75-125      |      |           |       |
| Nitrite-N                         | 2.07   | 0.100              | mg-N/L | 2.00        | ND  | 103  | 75-125      |      |           |       |
| Orthophosphorus                   | 2.06   | 0.10               | mg-P/L | 2.00        | ND  | 103  | 75-125      |      |           |       |
| Sulfate                           | 2.11   | 0.100              | mg/L   | 2.00        | ND  | 105  | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

Wet Chemistry - Quality Control

Batch BFK0561 - No Prep Wet Chem

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte                   | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------------------------|--------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BFK0561-BLK1)</b>         |        |                 |       |             | Prepared: 20-Nov-2017 Analyzed: 21-Nov-2017 11:06                    |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 1.00            | mg/L  |             |  |      |             |     |           | U     |
| <b>LCS (BFK0561-BS1)</b>            |        |                 |       |             | Prepared: 20-Nov-2017 Analyzed: 21-Nov-2017 11:32                    |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 19.1   | 1.00            | mg/L  | 20.0        |  | 95.5 | 90-110      |     |           | D     |
| <b>Duplicate (BFK0561-DUP1)</b>     |        |                 |       |             | Source: 17K0256-02 Prepared: 20-Nov-2017 Analyzed: 21-Nov-2017 12:23 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | ND     | 1.00            | mg/L  |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BFK0561-MS1)</b>   |        |                 |       |             | Source: 17K0256-02 Prepared: 20-Nov-2017 Analyzed: 21-Nov-2017 13:28 |      |             |     |           |       |
| Dissolved Organic Carbon, Dissolved | 20.0   | 1.00            | mg/L  | 20.0        | ND   | 100  | 75-125      |     |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
04-Dec-2017 17:20

**Wet Chemistry - Quality Control**

**Batch BFK0571 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: U

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units      | Spike Level                                       | Source Result | %REC | %REC Limits  | RPD | RPD Limit | Notes |
|---------------------------------|--------|---|------------|---|---------------|------|--------------|-----|-----------|-------|
| <b>Blank (BFK0571-BLK1)</b>     |        | Prepared: 20-Nov-2017 Analyzed: 20-Nov-2017 14:21 |            |   |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   |               |      |              |     |           | U     |
| <b>Duplicate (BFK0571-DUP1)</b> |        | <b>Source: 17K0256-02</b>                         |            | Prepared: 20-Nov-2017 Analyzed: 20-Nov-2017 14:21 |               |      |              |     |           |       |
| Alkalinity, Total               | ND     | 1.00  | mg/L CaCO3 |   | ND            |      |              |     |           | U     |
| <b>Reference (BFK0571-SRM1)</b> |        | Prepared: 20-Nov-2017 Analyzed: 20-Nov-2017 14:21 |            |   |               |      |              |     |           |       |
| Alkalinity, Total               | 108    | 1.00  | mg/L CaCO3 | 108   |               | 100  | 30.37-108.33 |     |           |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
04-Dec-2017 17:20

**Wet Chemistry - Quality Control**

**Batch BFK0591 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BFK0591-BLK1)</b>     |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 21-Nov-2017 Analyzed: 21-Nov-2017 08:06 |      |             |      |           |       |
| Dissolved Solids                | ND     | 5.0                       | mg/L  |             |   |      |             |      |           | U     |
| <b>LCS (BFK0591-BS1)</b>        |        |                           |       |             |   |      |             |      |           |       |
|                                 |        |                           |       |             | Prepared: 21-Nov-2017 Analyzed: 21-Nov-2017 08:06 |      |             |      |           |       |
| Dissolved Solids                | 500    | 5.0                       | mg/L  | 500         |   | 100  | 90-110      |      |           |       |
| <b>Duplicate (BFK0591-DUP1)</b> |        |                           |       |             |   |      |             |      |           |       |
|                                 |        | <b>Source: 17K0256-04</b> |       |             | Prepared: 21-Nov-2017 Analyzed: 21-Nov-2017 08:06 |      |             |      |           |       |
| Dissolved Solids                | 27600  | 200                       | mg/L  |             | 26600   |      |             | 3.61 | 20        |       |



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Reported:  
04-Dec-2017 17:20

**Certified Analyses included in this Report**

| Analyte                               | Certifications                  |
|---------------------------------------|---------------------------------|
| <b>EPA 300.0 in Water</b>             |                                 |
| Bromide                               | DoD-ELAP,WADOE,NELAP            |
| Chloride                              | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Fluoride                              | DoD-ELAP,WADOE,WA-DW            |
| Nitrate-N                             | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Nitrite-N                             | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Orthophosphorus                       | DoD-ELAP,WADOE,WA-DW,NELAP      |
| Sulfate                               | DoD-ELAP,WADOE,WA-DW,NELAP      |
| <b>EPA 8260C in Water</b>             |                                 |
| Chloromethane                         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Chloride                        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromomethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroethane                          | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Trichlorofluoromethane                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrolein                              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloro-1,2,2-Trifluoroethane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acetone                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloroethene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromoethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Iodomethane                           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Methylene Chloride                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Acrylonitrile                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| Carbon Disulfide                      | DoD-ELAP,NELAP,CALAP,WADOE      |
| trans-1,2-Dichloroethene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Vinyl Acetate                         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Butanone                            | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2,2-Dichloropropane                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| cis-1,2-Dichloroethene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Chloroform                            | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromochloromethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1-Trichloroethane                 | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1-Dichloropropene                   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Carbon tetrachloride                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloroethane                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Benzene                               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |





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Reported:  
04-Dec-2017 17:20

|                             |                                 |
|-----------------------------|---------------------------------|
| Trichloroethene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dichloropropane         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Bromodichloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromomethane              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Chloroethyl vinyl ether   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Methyl-2-Pentanone        | DoD-ELAP,NELAP,CALAP,WADOE      |
| cis-1,3-Dichloropropene     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Toluene                     | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,3-Dichloropropene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 2-Hexanone                  | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2-Trichloroethane       | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,3-Dichloropropane         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Tetrachloroethene           | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dibromochloromethane        | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromoethane           | DoD-ELAP,NELAP,CALAP,WADOE      |
| Chlorobenzene               | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Ethylbenzene                | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,1,1,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| m,p-Xylene                  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| o-Xylene                    | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Styrene                     | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromoform                   | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,1,2,2-Tetrachloroethane   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichloropropane      | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| trans-1,4-Dichloro 2-Butene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Propylbenzene             | DoD-ELAP,NELAP,CALAP,WADOE      |
| Bromobenzene                | DoD-ELAP,NELAP,CALAP,WADOE      |
| Isopropyl Benzene           | DoD-ELAP,NELAP,CALAP,WADOE      |
| 2-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 4-Chlorotoluene             | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| t-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3,5-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2,4-Trimethylbenzene      | DoD-ELAP,NELAP,CALAP,WADOE      |
| s-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 4-Isopropyl Toluene         | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,3-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,4-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Butylbenzene              | DoD-ELAP,NELAP,CALAP,WADOE      |
| 1,2-Dichlorobenzene         | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2-Dibromo-3-chloropropane | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation

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Reported:  
04-Dec-2017 17:20

|                          |                                 |
|--------------------------|---------------------------------|
| 1,2,4-Trichlorobenzene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Hexachloro-1,3-Butadiene | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Naphthalene              | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| 1,2,3-Trichlorobenzene   | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Dichlorodifluoromethane  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| Methyl tert-butyl Ether  | DoD-ELAP,ADEC,NELAP,CALAP,WADOE |
| n-Hexane                 | WADOE                           |
| 2-Pentanone              | WADOE                           |

**SM 2320 B-97 in Water**

|                         |                            |
|-------------------------|----------------------------|
| Alkalinity, Bicarbonate | NELAP,WADOE,WA-DW,DoD-ELAP |
| Alkalinity, Carbonate   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Hydroxide   | WADOE,WA-DW,DoD-ELAP,NELAP |
| Alkalinity, Total       | DoD-ELAP,WADOE,WA-DW,NELAP |

**SM 5310 B-00 in Water**

|                          |                   |
|--------------------------|-------------------|
| Dissolved Organic Carbon | WADOE,WA-DW,NELAP |
|--------------------------|-------------------|

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 05/11/2018 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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**Reported:**  
04-Dec-2017 17:20

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.

**Data Gap #2ABC**  
**2017 Water Samples (BAL)**

## QA/QC Solutions, LLC



James J. Mc Ateer, Jr., Managing Member  
7532 Champion Hill Rd. SE  
Salem, Oregon 97306  
Telephone: 503.763.6948  
Facsimile: 503.566.2114  
Cellular: 503.881.1501  
email: jjmcateer@msn.com

February 19, 2018

Troy Bussey Jr., P.E.  
PIONEER Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, Washington 98503

Subject: Feasibility Study Data Gap Investigation, Former Arkema Manufacturing Site, Tacoma, WA;  
Water Sample Data Validation Review Summary  
Client Project No.: Not Specified  
QA/QC Solutions, LLC Project No.: 092317.1

Dear Troy:

This letter documents the results of the data validation review of the metals (elements) analyses completed on water samples associated with Feasibility Study Data Gap Investigation completed at the Former Arkema Manufacturing Site located in Tacoma, Washington. Details of the investigation completed are provided in the Feasibility Study Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. (Pioneer 2017).

The data reported were validated to verify the laboratory quality assurance and quality control (QA/QC) procedures were documented and that the overall quality of the data reported is sufficient to support its intended purposes. A summary of the overall assessment of data quality, the data set, a summary of the analytical methods used to complete the chemical analyses, a summary of the data validation procedures used, and a summary of the reasons why data were qualified (including other items noted during data validation) is presented below.

### Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratory during the analysis of the samples were generally acceptable. Selected sample results required qualification during data validation because method-specific QA/QC criteria were not met; results maybe qualified for more than one reason. During data validation, the following actions were taken:

- A total of 59 results reported as detected were qualified as estimated (assigned a *J* qualifier).
- A total of 39 results reported as detected were restated as undetected (assigned a *U* qualifier).
- A total of 2 results reported as undetected (*U*) were qualified as undetected and estimated (assigned a *UJ* qualifier).
- No sample results required rejection (*R*).

***\*Note: A total of 1,804 sample results (including field duplicates and equipment rinsate blanks) were reported.***

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J or UJ*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data). Analytical data that were reported as undetected (*U*) by the laboratory or that were restated as undetected (*U*) during data validation are usable.

## Data Set

The data set consisted of 234 water samples that were collected and submitted to the laboratory and was comprised of the following:

- 59 unfiltered natural samples.
- 159 filtered (field filtered, 0.45 µm) natural samples.
- 2 unfiltered natural field duplicate samples.
- 6 filtered (field filtered, 0.45 µm) natural field duplicate samples.
- 3 unfiltered equipment blank samples.
- 5 filtered (field filtered, 0.45 µm) equipment blank samples.

Samples were collected during the month of October and November 2017. A summary of the samples collected and the analyses completed is presented in Table 1.

***\* Several samples required multiple reanalyses and only data considered reportable during data validation were reported in the electronic data deliverables (EDDs).***

Analyses were completed by Brooks Applied Labs located in Bothell, Washington. A total of 13 work orders summarizing the results of the samples and associated quality control data.

## Analytical Methods

The analytical methods that were used to complete the chemical analyses included the following:

- Total recoverable and dissolved metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, and Si) by U.S. EPA Method 1638 (modified) (U.S. EPA 1999). The original sample bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C. Quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS).
- Total and dissolved mercury Total and dissolve mercury by U.S. EPA 1631E (U.S. EPA 2002a). Samples were oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS)

detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

- Brooks SOP #BAL-4100 (IC-ICP-MS) for Arsenic Speciation Analysis by IC-ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS) (dissolved phase only) (Brooks SOP). Analyses were completed for arsenite [as As(III)], arsenate [as As(V)], Monomethylarsonic Acids (MMAs), and Dimethylarsinic Acids (DMAs). All analyses were performed by using a laboratory proprietary procedures; Brooks SOP #BAL-4100 was not released for review to QA/QC Solutions, LLC.
- USEPA 1640 Mod (column chelation) for total recoverable metals (Ni and/or Pb) by U.S. EPA Method 1640 (modified) (U.S. EPA 1997). Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid (HNO<sub>3</sub>) and then prepared according to the analytical method. All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C. Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS).

Analyses for dissolved metals were field filtered through 0.45 µm filter. These dissolved fractions were analyzed for the following elements. A summary of the samples collected and the analyses completed is presented in Table 1.

## Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results that were reported by the laboratory; this level of validation is also referred to as an abbreviated data review (equivalent to "Stage 2B" review per U.S. EPA 2009, which is equivalent to "Level EPA2B" for use with the Washington Department of Ecology EIMS database). The analytical data were validated generally following the applicable guidance and requirements:

- *Guidance on Environmental Data Verification and Validation* (U.S. EPA 2002b)
- *USEPA Contract Laboratory Program, National Functional Guidelines for Superfund Organic Methods Data Review*. Final. OSWER 9240.1-45. USEPA/540/R-08/01 (U.S. EPA 2008).
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review*. Final. OSWER 9240.1-51. EPA 540-R-10-011 (U.S. EPA 2010).
- Method-specific and laboratory-established quality control requirements, as applicable.
- The quality control limits summarized in the *Feasibility Study Data Gap Investigation Work Plan, Former Arkema Manufacturing Site*. (Pioneer 2017).

Data validation procedures were mostly modified to accommodate QA/QC requirements for methods that are not specifically addressed by the USEPA functional guidelines. In this situation, method-specific, laboratory-established, project-specific control limits were used, as necessary, to determine if

qualification of the data was necessary. The laboratory data deliverables that were validated, if present, included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Results for applicable method blanks and field blanks to determine whether an analyte that was reported as detected in any sample was the result of possible contamination introduced at the laboratory or during field sampling, respectively.
- Results for applicable standard reference material (SRM), laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, matrix spike (MS), and/or matrix spike duplicate (MSD) recoveries to assess analytical accuracy
- Results for applicable laboratory duplicate sample, duplicate LCS, and/or MSD analyses to assess analytical precision.
- Results for the field duplicate samples to provide additional information in support of the quality assurance review.
- Laboratory summaries of analytical results.

Verification of applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed during the abbreviated data validation review. There may be analytical problems that could only be identified by completing a thorough review (i.e., 100-percent data validation) of all original instrument printouts and associated analytical quality control results. Verification of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narratives did not indicate any significant problems with data that were not reviewed during data validation. The adequacy of the sampling procedures was not completed during data validation.

Performance based control limits established by the laboratory and control limits provided in the method protocols were used to evaluate data quality and determine the need for data qualification. Applicable laboratory control limits (e.g., recoveries for surrogate compounds, LCSs and LCS duplicates, and MS/MSDs) were used during data validation. Data qualifiers were assigned during data validation to both hardcopy data sheets and the EDD when applicable QA/QC limits were not met and qualification of the data was warranted. Data qualifiers were assigned following guidance specified by U.S. EPA (2002b, 2009, and 2010) and the quality control requirements specified in the applicable analytical methods.

## Reasons for Data Qualification

The reasons for data qualification and a summary of the qualified data are summarized in Table 2 and included the following:

- A total of 5 results reported as detected at a concentration above the method detection limit (MDL), but less than the reporting limit (RL) were qualified as estimated (*J*).
- A total of 17 results were qualified as estimated (*J*) because the recoveries did not meet applicable control limits.
- One result was qualified as estimated (*UJ*) because the MS/MSD recoveries did not meet applicable control limits.



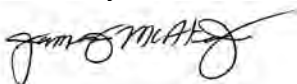
- One result was qualified as estimated (*J*) because the relative percent difference (RPD) did not meet the applicable control limit.
- One result was qualified as estimated (*UJ*) because matrix inference was noted by the laboratory.
- One result was qualified as estimated (*J*) because an incorrect sample was used, as noted by the laboratory.
- One result was qualified as estimated (*J*) because the dissolved concentration was significantly greater than the total concentration.
- A total of 15 mercury results were qualified as estimated (*J*) because of elevated detections in the method blanks.
- A total of 19 results were qualified as estimated (*J*) because the element was present in the associated equipment blank. In this instance, the concentration in the sample was >2x, but <5x the concentration found in the associated equipment blank. When an element was reported as detected in an equipment blank but was either not detected in the samples or the concentrations was >5x the concentration found, no data required qualification.
- A total of 39 results were restated as undetected (*U*) because the element was present in the associated equipment blank. In this instance, the concentration in the sample was <2x concentration found in the associated equipment blank. Results were either restated as undetected up to the concentration found in the associated equipment blank (highlighted in yellow in Table 2) or were restated as undetected at the concentration reported. When an element was reported as detected in an equipment blank but was either not detected in the samples or the concentrations was >5x the concentration found, no data required qualification.

### **General Comments**

There were some quality control items, or general observations, identified during data validation and/or that was noted by the laboratory in the case narratives, but is not discussed herein. However, qualification of the sample results was not required in these instances. Data users should read the laboratory case narratives for additional details.

This concludes the data validation review summary. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at [jjmcateer@msn.com](mailto:jjmcateer@msn.com).

Cordially,



QA/QC Solutions, LLC

James J. Mc Ateer, Jr., Managing Member

Attachments

## **References**

Brooks SOP. Brooks SOP #BAL-4100 (IC-ICP-MS) for Arsenic Speciation by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS)

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U.S. EPA 1997. Method 1640: Determination of Trace Elements in Water by Preconcentration and Inductively Coupled Plasma-Mass Spectrometry. April 1997. U.S. Environmental Protection Agency Office of Water Engineering and Analysis Division (4303), Washington, D.C.

U.S. EPA 2002a. Method 1631, Revision E: Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry. EPA-821-R-02-019. August 2002. U.S. Environmental Protection Agency, Office of Water (4303), Washington, DC.

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U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA 2010. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OSWER 9240.1-51. EPA 540-R-10-011. January 2010. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC.

**Table 1. Summary of Samples Collected and Analyses Completed**

| Sample Number                   | Laboratory Sample Number | Sample Date | Analytical Method                     |
|---------------------------------|--------------------------|-------------|---------------------------------------|
| PW-119+25-ST1-100417            | 1741002-01               | 10/04/17    | EPA 1638 Mod<br>EPA 1631E             |
| PW-119+25-ST1-100417-(20)       | 1741002-02               | 10/04/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E |
| PW-120+75-ST1-100517            | 1741002-03               | 10/05/17    | EPA 1638 Mod<br>EPA 1631E             |
| PW-120+75-ST1-100517-(20)       | 1741002-04               | 10/05/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E |
| PW-123+25-ST1-100517            | 1741002-05               | 10/05/17    | EPA 1638 Mod<br>EPA 1631E             |
| PW-123+25-ST1-100517-(20)       | 1741002-06               | 10/05/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E |
| PW-125+00-ST1-100517            | 1741002-07RE1            | 10/05/17    | EPA 1631E                             |
| PW-125+00-ST1-100517-(20)       | 1741002-08               | 10/05/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E |
| PW-126+80-ST1-100617            | 1741002-09               | 10/06/17    | EPA 1638 Mod<br>EPA 1631E             |
| PW-126+80-ST1-100617-(20)       | 1741002-10               | 10/06/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E |
| PW-128+50-ST1-100617            | 1741002-11               | 10/06/17    | EPA 1638 Mod<br>EPA 1631E             |
| PW-128+50-ST1-100617-(20)       | 1741002-12               | 10/06/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E |
| PW-130+75-ST1-100617            | 1741002-13               | 10/06/17    | EPA 1638 Mod<br>EPA 1631E             |
| PW-130+75-ST1-100617-(20)       | 1741002-14               | 10/06/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E |
| GW-3C6-1R-101117-4.5-9.5-(20)   | 1741063-01               | 10/11/17    | BAL-4100                              |
| GW-3C7-2R-101117-24.5-29.3-(20) | 1741063-02               | 10/11/17    | BAL-4100                              |
| GW-2C2-2-101117-20.6-25.6-(20)  | 1741063-03               | 10/11/17    | BAL-4100                              |
| GW-2C1-1R-101117-5.1-10.1-(20)  | 1741063-04               | 10/11/17    | BAL-4100                              |
| GW-1C2-2-101117-13.8-23.6-(20)  | 1741063-05               | 10/11/17    | BAL-4100                              |
| GW-1C3-1-101117-3.5-8.5-(20)    | 1741063-06               | 10/11/17    | BAL-4100                              |
| GW-2D1-1-101217-7.5-12.5-(20)   | 1741063-07               | 10/12/17    | BAL-4100                              |
| GW-2D3-2-101217-26.5-31.5-(20)  | 1741063-08               | 10/12/17    | BAL-4100                              |
| GW-1D1-1-101217-9.6-14.6-(20)   | 1741063-09               | 10/12/17    | BAL-4100                              |
| GW-3C5-2-101217-17.5-22.5-(20)  | 1741063-10               | 10/12/17    | BAL-4100                              |
| GW-3C2-1-101217-7.5-12-(20)     | 1741063-11               | 10/12/17    | BAL-4100                              |
| GW-3C1-1-101217-3-8-(20)        | 1741063-12               | 10/12/17    | BAL-4100                              |
| GW-3D1-1-101217-4.5-12.5-(20)   | 1742001-01               | 10/12/17    | BAL-4100                              |
| GW-4D2-1-101217-4.3-9.3-(20)    | 1742001-02               | 10/12/17    | BAL-4100                              |
| GW-3E1-1-101217-5-10-(20)       | 1742001-03               | 10/12/17    | BAL-4100                              |

Table 1, continued

| Sample Number                   | Laboratory Sample Number | Sample Date | Analytical Method                                     |
|---------------------------------|--------------------------|-------------|---|
| GW-2B1-1-101317-3-10-(20)       | 1742001-04               | 10/13/17    | BAL-4100  |
| GW-2B2-2-101317-30.8-35.8-(20)  | 1742001-05               | 10/13/17    | BAL-4100  |
| GW-2A1-1-101317-9-14-(20)       | 1742001-06               | 10/13/17    | BAL-4100  |
| GW-4B3-1-101317-4.5-10.5-(20)   | 1742001-07               | 10/13/17    | BAL-4100  |
| GW-4B2-2-101317-22.5-27.5-(20)  | 1742001-08               | 10/13/17    | BAL-4100  |
| GW-4B3-2-101317-17.5-27.5-(20)  | 1742001-09               | 10/13/17    | BAL-4100  |
| GW-3E1-2-101317-17.5-22.5-(20)  | 1742001-10               | 10/13/17    | BAL-4100  |
| GW-4F1-1-101317-4.5-9.5-(20)    | 1742001-11               | 10/13/17    | BAL-4100  |
| GW-3A3-1R-101617-8.2-13.2       | 1742020-01               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-3A3-1R-101617-8.2-13.2-(20)  | 1742020-02               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |
| GW-3A2-2R-101617-22.3-27.3      | 1742020-03               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-3A2-2R-101617-22.3-27.3-(20) | 1742020-04               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |
| GW-3A7-1R-101617                | 1742020-05               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-3A7-1R-101617-(20)           | 1742020-06               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |
| GW-3A6-2R-101617                | 1742020-07               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-3A6-2R-101617-(20)           | 1742020-08               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |
| GW-4B4-1-101617                 | 1742020-09               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-4B4-1-101617-(20)            | 1742020-10               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |
| GW-4B4-2-101617                 | 1742020-11               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-4B4-2-101617-(20)            | 1742020-12               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |
| GW-4B4-2-101617-(01)            | 1742020-13               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-4B4-2-101617-(21)            | 1742020-14               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |

Table 1, continued

| Sample Number          | Laboratory Sample Number | Sample Date | Analytical Method                                     |
|------------------------|--------------------------|-------------|---|
| GW-5B1-1R-101617       | 1742020-15               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-5B1-1R-101617-(20)  | 1742020-16               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |
| GW-5B1-2R-101617       | 1742020-17               | 10/16/17    | EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod             |
| GW-5B1-2R-101617-(20)  | 1742020-18               | 10/16/17    | BAL-4100<br>EPA 1638 Mod<br>EPA 1631E<br>EPA 1640 Mod |
| GW-5C16-1R-101717-(20) | 1742020-19               | 10/17/17    | BAL-4100  |
| GW-5C16-1R-101717-(21) | 1742020-20               | 10/17/17    | BAL-4100  |
| GW-5C16-2R-101717-(20) | 1742020-21               | 10/17/17    | BAL-4100  |
| GW-5C12-1-101717-(20)  | 1742020-22               | 10/17/17    | BAL-4100  |
| GW-5C10-2-101717-(20)  | 1742020-23               | 10/17/17    | BAL-4100  |
| GW-5C13-1-101717-(20)  | 1742045-01               | 10/17/17    | BAL-4100  |
| GW-5D8-2-101717-(20)   | 1742045-02               | 10/17/17    | BAL-4100  |
| GW-5E2-1-101817-(20)   | 1742045-03               | 10/18/17    | BAL-4100  |
| GW-4D1-1-101817-(20)   | 1742045-04RE1            | 10/18/17    | BAL-4100  |
| GW-4E1-2-101817-(20)   | 1742045-05RE1            | 10/18/17    | BAL-4100  |
| GW-5E1-1-101817-(20)   | 1742045-06               | 10/18/17    | BAL-4100  |
| GW-5F1-1-101817-(20)   | 1742045-07               | 10/18/17    | BAL-4100  |
| GW-5E8-1-101817-(20)   | 1742045-08RE1            | 10/18/17    | BAL-4100  |
| GW-5E1-2-101817-(20)   | 1742045-09RE1            | 10/18/17    | BAL-4100  |
| EB-101717-(20)         | 1742045-10RE1            | 10/17/17    | BAL-4100  |
| GW-4F1-2-101817-(20)   | 1742045-11RE1            | 10/18/17    | BAL-4100  |
| GW-4F1-2-101817-(21)   | 1742045-12RE1            | 10/18/17    | BAL-4100  |
| EB-101817-(20)         | 1742045-13RE1            | 10/18/17    | BAL-4100  |
| GW-5D7-1R-101917-(20)  | 1742045-14RE1            | 10/19/17    | BAL-4100  |
| GW-5D5-1-101917-(20)   | 1742045-15RE1            | 10/19/17    | BAL-4100  |
| GW-5E4-1-101917-(20)   | 1742045-16RE1            | 10/19/17    | BAL-4100  |
| GW-4C1-1-101717-(20)   | 1742045-17RE1            | 10/17/17    | BAL-4100  |
| GW-5C14-2-101717-(20)  | 1742045-18RE1            | 10/17/17    | BAL-4100  |
| GW-6E5-1-102017-(20)   | 1743007-01RE1            | 10/20/17    | BAL-4100  |
| GW-6F1-2-102017-(20)   | 1743007-02RE1            | 10/20/17    | BAL-4100  |
| GW-6F2-1-102017-(20)   | 1743007-03RE1            | 10/20/17    | BAL-4100  |
| GW-5G1-1-102017-(20)   | 1743007-04RE1            | 10/20/17    | BAL-4100  |
| GW-6G1-1-102017-(20)   | 1743007-05RE1            | 10/20/17    | BAL-4100  |
| GW-5C21-2-102017-(20)  | 1743007-06RE1            | 10/20/17    | BAL-4100  |
| GW-4C2-1-102017-(20)   | 1743007-07RE1            | 10/20/17    | BAL-4100  |

Table 1, continued

| Sample Number                | Laboratory Sample Number | Sample Date | Analytical Method |
|------------------------------|--------------------------|-------------|-------------------|
| GW-7F2-1-102317-(20)         | 1743031-01               | 10/23/17    | BAL-4100          |
| GW-7F3-1-102317-(20)         | 1743031-02               | 10/23/17    | BAL-4100          |
| GW-7F1-2-102317-(20)         | 1743031-03               | 10/23/17    | BAL-4100          |
| GW-7F4-1-102317-(20)         | 1743031-04               | 10/23/17    | BAL-4100          |
| GW-7E9-2-102317-(20)         | 1743031-05               | 10/23/17    | BAL-4100          |
| GW-7E10-1-102317-(20)        | 1743031-06RE1            | 10/23/17    | BAL-4100          |
| GW-7E4-2-102317-(20)         | 1743031-07RE1            | 10/23/17    | BAL-4100          |
| GW-6E12-2-102317-(20)        | 1743031-08RE1            | 10/23/17    | BAL-4100          |
| EB-102317-(20)               | 1743031-09RE1            | 10/23/17    | BAL-4100          |
| GW-7E6-2-102417-(20)         | 1743031-10               | 10/24/17    | BAL-4100          |
| GW-7E8-1-102417-(20)         | 1743031-11               | 10/24/17    | BAL-4100          |
| GW-7E16-2-102417-(20)        | 1743031-12RE1            | 10/24/17    | BAL-4100          |
| GW-6E2-1-102417-(20)         | 1743031-13RE1            | 10/24/17    | BAL-4100          |
| GW-6E6-1-102417-(20)         | 1743031-14RE1            | 10/24/17    | BAL-4100          |
| GW-7E3-1-102417-(20)         | 1743049-01RE1            | 10/24/17    | BAL-4100          |
| GW-6B19-2-102417-(20)        | 1743049-02RE1            | 10/24/17    | BAL-4100          |
| GW-6B19-2-102417-(21)        | 1743049-03RE1            | 10/24/17    | BAL-4100          |
| GW-6D25-2-102417-(20)        | 1743049-04RE1            | 10/24/17    | BAL-4100          |
| GW-6G3-2-102517-(20)         | 1743049-05RE1            | 10/25/17    | BAL-4100          |
| GW-6H1-1-102517-(20)         | 1743049-06               | 10/25/17    | BAL-4100          |
| GW-7E13-2R-102517-(20)       | 1743049-07               | 10/25/17    | BAL-4100          |
| GW-6D14-1-102517-(20)        | 1743049-08RE1            | 10/25/17    | BAL-4100          |
| GW-6E1-1-102517-(20)         | 1743049-09RE1            | 10/25/17    | BAL-4100          |
| GW-6E9-2-102517-(20)         | 1743049-10RE1            | 10/25/17    | BAL-4100          |
| GW-5D2-1R-102517-(20)        | 1743049-11RE2            | 10/25/17    | BAL-4100          |
| GW-6D25-1-102517-(20)        | 1743049-12RE1            | 10/25/17    | BAL-4100          |
| GW-7E7-2-102517-(20)         | 1743049-13RE1            | 10/25/17    | BAL-4100          |
| GW-8F1-1R-102517-(20)        | 1743049-14               | 10/25/17    | BAL-4100          |
| GW-1B4-1-102617-2.9-7.9-(20) | 1743049-15               | 10/26/17    | BAL-4100          |
| GW-7I1-1-102717-(20)         | 1744007-01               | 10/27/17    | BAL-4100          |
| GW-7I1-1-102717-(21)         | 1744007-02               | 10/27/17    | BAL-4100          |
| GW-7I3-2-102717-(20)         | 1744007-03               | 10/27/17    | BAL-4100          |
| GW-8H1-1-102717-(20)         | 1744007-04               | 10/27/17    | BAL-4100          |
| GW-7G1-1-102717-(20)         | 1744007-05               | 10/27/17    | BAL-4100          |
| GW-7G1-2-102717-(20)         | 1744007-06               | 10/27/17    | BAL-4100          |
| GW-8G2-1-102717-(20)         | 1744007-07               | 10/27/17    | BAL-4100          |
| GW-8G3-2-102717-(20)         | 1744007-08               | 10/27/17    | BAL-4100          |
| GW-8F2-2R-102717-(20)        | 1744007-09               | 10/27/17    | BAL-4100          |

**Table 1, continued**

| Sample Number           | Laboratory Sample Number | Sample Date | Analytical Method                                     |
|-------------------------|--------------------------|-------------|---|
| GW-131+00-1-102717      | 1744007-10               | 10/27/17    | EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod             |
| GW-131+00-1-102717-(20) | 1744007-11               | 10/27/17    | BAL-4100<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-129+65-0-103017      | 1744028-01               | 10/30/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-129+65-0-103017-(20) | 1744028-02               | 10/30/17    | BAL-4100<br>EPA 1631E<br>EPA 1638 Mod                 |
| GW-128+30-0-103017      | 1744028-03               | 10/30/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-128+30-0-103017-(20) | 1744028-04               | 10/30/17    | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                 |
| GW-128+30-2-103017      | 1744028-05               | 10/30/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-128+30-2-103017-(20) | 1744028-06               | 10/30/17    | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                 |
| GW-129+65-2-103017      | 1744028-07               | 10/30/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-129+65-2-103017-(20) | 1744028-08               | 10/30/17    | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                 |
| GW-131+00-2-102717      | 1744028-09               | 10/27/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-131+00-2-102717-(20) | 1744028-10               | 10/27/17    | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                 |
| GW-126+90-2-103017      | 1744028-11               | 10/30/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-126+90-2-103017-(20) | 1744028-12               | 10/30/17    | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                 |
| GW-125+50-2-103017      | 1744028-13               | 10/30/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-125+50-2-103017-(20) | 1744028-14               | 10/30/17    | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                 |
| GW-124+00-2-103017      | 1744028-15               | 10/30/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-124+00-2-103017-(20) | 1744028-16               | 10/30/17    | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                 |
| GW-121+80-2-103017      | 1744028-17               | 10/30/17    | EPA 1631E<br>EPA 1638 Mod                             |
| GW-121+80-2-103017-(20) | 1744028-18               | 10/30/17    | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                 |
| GW-6E3-2-103017-(20)    | 1744028-19RE1            | 10/30/17    | BAL-4100  |
| GW-129+65-1-103117      | 1744028-20               | 10/31/17    | EPA 1631E<br>EPA 1638 Mod                             |

**Table 1, continued**

| <b>Sample Number</b>    | <b>Laboratory Sample Number</b> | <b>Sample Date</b> | <b>Analytical Method</b>                                  |
|-------------------------|---------------------------------|--------------------|---|
| GW-129+65-1-103117-(20) | 1744028-21                      | 10/31/17           | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                     |
| GW-128+30-1-103117      | 1744028-22                      | 10/31/17           | EPA 1631E<br>EPA 1638 Mod                                 |
| GW-128+30-1-103117-(20) | 1744028-23                      | 10/31/17           | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                     |
| GW-125+50-1-103117      | 1744028-24                      | 10/31/17           | EPA 1631E<br>EPA 1638 Mod                                 |
| GW-125+50-1-103117-(20) | 1744028-25                      | 10/31/17           | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                     |
| GW-126+90-0-103117      | 1744028-26                      | 10/31/17           | EPA 1631E<br>EPA 1638 Mod                                 |
| GW-126+90-0-103117-(20) | 1744028-27                      | 10/31/17           | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                     |
| GW-125+50-0-103117      | 1744028-28                      | 10/31/17           | EPA 1631E<br>EPA 1638 Mod                                 |
| GW-125+50-0-103117-(20) | 1744028-29                      | 10/31/17           | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                     |
| GW-124+00-1-103117      | 1744028-30                      | 10/31/17           | EPA 1631E<br>EPA 1638 Mod                                 |
| GW-124+00-1-103117-(20) | 1744028-31                      | 10/31/17           | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                     |
| GW-124+00-0-103117      | 1744028-32                      | 10/31/17           | EPA 1631E<br>EPA 1638 Mod                                 |
| GW-124+00-0-103117-(20) | 1744028-33                      | 10/31/17           | EPA 1631E<br>BAL-4100<br>EPA 1638 Mod                     |
| GW-126+90-3-103117      | 1744050-01                      | 10/31/17           | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-126+90-3-103117-(20) | 1744050-02                      | 10/31/17           | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-126+90-3-103117-(01) | 1744050-03                      | 10/31/17           | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| GW-126+90-3-103117-(21) | 1744050-04                      | 10/31/17           | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-120+75-2-103117      | 1744050-05                      | 10/31/17           | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-120+75-2-103117-(20) | 1744050-06                      | 10/31/17           | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-6G2-3-110117-(20)    | 1744050-07                      | 11/01/17           | BAL-4100  |
| GW-5G1-3-110117-(20)    | 1744050-08                      | 11/01/17           | BAL-4100  |



Table 1, continued

| Sample Number           | Laboratory Sample Number | Sample Date | Analytical Method   |
|-------------------------|--------------------------|-------------|---|
| GW-5H1-1-110117-(20)    | 1744050-09               | 11/01/17    | BAL-4100  |
| GW-4G1-1-110117-(20)    | 1744050-10               | 11/01/17    | BAL-4100  |
| GW-5H2-2-110117-(20)    | 1744050-11               | 11/01/17    | BAL-4100  |
| GW-4G2-2-110117-(20)    | 1744050-12               | 11/01/17    | BAL-4100  |
| GW-4H3-1-110117-(20)    | 1744050-13               | 11/01/17    | BAL-4100  |
| GW-5I2-1-110117-(20)    | 1744050-14               | 11/01/17    | BAL-4100  |
| GW-4H4-2-110117-(20)    | 1744050-15               | 11/01/17    | BAL-4100  |
| GW-5D1-3-110117-(20)    | 1744050-16               | 11/01/17    | BAL-4100  |
| GW-6E7-3-110117-(20)    | 1744050-17               | 11/01/17    | BAL-4100  |
| EB-110117-(20)          | 1744050-18               | 11/01/17    | BAL-4100  |
| GW-122+60-2-110217      | 1744050-19               | 11/02/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| GW-122+60-2-110217-(20) | 1744050-20               | 11/02/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-126+90-1-110217      | 1744050-21               | 11/02/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| GW-126+90-1-110217-(20) | 1744050-22               | 11/02/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-5B1-3R-110217        | 1744050-23               | 11/02/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-5B1-3R-110217-(20)   | 1744050-24               | 11/02/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-4B2-3-110217         | 1744050-25               | 11/02/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| GW-4B2-3-110217-(20)    | 1744050-26               | 11/02/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-4B1-3-110217-(20)    | 1744050-27               | 11/02/17    | BAL-4100  |
| GW-3A1-3R-110217-(20)   | 1744050-28               | 11/02/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-3A1-3R-110217        | 1744050-29               | 11/02/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| EB-110217               | 1744050-30               | 11/02/17    | BAL-4100  |
| GW-7E5-3-110217-(20)    | 1744050-31               | 11/02/17    | BAL-4100  |
| GW-6E8-3-110217-(20)    | 1744050-32               | 11/02/17    | BAL-4100  |
| GW-121+80-1-110317      | 1745005-01               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |

Table 1, continued

| Sample Number           | Laboratory Sample Number | Sample Date | Analytical Method   |
|-------------------------|--------------------------|-------------|---|
| GW-121+80-1-110317-(20) | 1745005-02               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-122+60-1-110317      | 1745005-03               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-122+60-1-110317-(20) | 1745005-04               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-122+60-3-110317      | 1745005-05               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| GW-122+60-3-110317-(20) | 1745005-06               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-122+60-0-110317      | 1745005-07               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-122+60-0-110317-(20) | 1745005-08               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-124+00-3-110317      | 1745005-09               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-124+00-3-110317-(20) | 1745005-10               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-IC1-3-110317-(20)    | 1745005-11               | 11/03/17    | BAL-4100  |
| GW-125+50-3-110317      | 1745005-12               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-125+50-3-110317-(20) | 1745005-13               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-128+30-3-110317      | 1745005-14               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-128+30-3-110317-(20) | 1745005-15               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| GW-129+65-3-110317      | 1745005-16               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-129+65-3-110317-(20) | 1745005-17               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |

Table 1, continued

| Sample Number                | Laboratory Sample Number | Sample Date | Analytical Method   |
|------------------------------|--------------------------|-------------|---|
| GW-131-00-3-110317           | 1745005-18               | 11/03/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| GW-131-00-3-110317-(20)      | 1745005-19               | 11/03/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| EB-110317                    | 1745005-20               | 11/03/17    | BAL-4100  |
| EB-111517                    | 1746027-01               | 11/15/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| EB-111517-(20)               | 1746027-02               | 11/15/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1638 Mod<br>EPA 1631E     |
| PW-120+75-ST1-DS-111517      | 1746027-03               | 11/15/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| PW-120+75-ST1-DS-111517-(20) | 1746027-04               | 11/15/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1638 Mod<br>EPA 1631E     |
| PW-120+75-SW-111517          | 1746027-05               | 11/15/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| PW-120+75-SW-111517-(20)     | 1746027-06               | 11/15/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1638 Mod<br>EPA 1631E     |
| PW-122+60-0-DS-111517        | 1746027-07               | 11/15/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| PW-122+60-0-DS-111517-(20)   | 1746027-08               | 11/15/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1638 Mod<br>EPA 1631E     |
| PW-124+00-0-DS-111517        | 1746027-09               | 11/15/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| PW-124+00-0-DS-111517-(20)   | 1746027-10               | 11/15/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1638 Mod<br>EPA 1631E     |
| PW-125+00-ST1-DS-111517      | 1746027-11               | 11/15/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| PW-125+00-ST1-DS-111517-(20) | 1746027-12               | 11/15/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| PW-125+00-SW-111517          | 1746027-13               | 11/15/17    | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| PW-125+00-SW-111517-(20)     | 1746027-14               | 11/15/17    | BAL-4100<br>EPA 1640 Mod<br>EPA 1638 Mod<br>EPA 1631E     |

**Table 1, continued**

| <b>Sample Number</b>         | <b>Laboratory<br/>Sample Number</b> | <b>Sample Date</b> | <b>Analytical Method</b>                                  |
|------------------------------|-------------------------------------|--------------------|---|
| PW-125+50-0-DS-111517        | 1746027-15                          | 11/15/17           | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| PW-125+50-0-DS-111517-(20)   | 1746027-16                          | 11/15/17           | BAL-4100<br>EPA 1640 Mod<br>EPA 1638 Mod<br>EPA 1631E     |
| PW-126+90-0-DS-111517        | 1746027-17                          | 11/15/17           | EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod                 |
| PW-126+90-0-DS-111517-(20)   | 1746027-18                          | 11/15/17           | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| PW-128+30-0-DS-111517        | 1746027-19                          | 11/15/17           | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| PW-128+30-0-DS-111517-(20)   | 1746027-20                          | 11/15/17           | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| PW-128+50-ST1-DS-111517      | 1746027-21                          | 11/15/17           | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| PW-128+50-ST1-DS-111517-(20) | 1746027-22                          | 11/15/17           | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |
| PW-128+50-SW-111517          | 1746027-23                          | 11/15/17           | EPA 1640 Mod<br>EPA 1631E<br>EPA 1640 Mod<br>EPA 1638 Mod |
| PW-128+50-SW-111517-(20)     | 1746027-24                          | 11/15/17           | BAL-4100<br>EPA 1640 Mod<br>EPA 1631E<br>EPA 1638 Mod     |

Table 2. Summary of Qualified Data

| Sample Number* | Laboratory Sample Number | Method       | Chemical                | Concentration | Units        | MDL            | RL             | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result   | Possible Bias <sup>b,c,d</sup> |
|----------------|--------------------------|--------------|-------------------------|---------------|--------------|----------------|----------------|----------------------|---------------------------|--|--|--------------------------------|
| 1741002-05     | PW-123+25-ST1-100517     | EPA 1638 Mod | Arsenic                 | 33.7          | ug/l         | 0.449          | 1.63           | J-1                  | J                         | Dissolved concentration greater than total. Reanalysis confirmed results.  | Dissolved fraction at 155 ug/L and total fraction at 33.7 ug/L                       | Indeterminate                  |
| 1741002-13RE1  | PW-130+75-ST1-100617     | EPA 1631E    | Mercury                 | 1.15          | ng/l         | 0.10           | 0.41           | J-1                  | J                         | Sample was incorrectly collected in HDPE bottle. Lab notes HDPE bottles are known to be permeable to mercury.                            | HDPE bottle used rather than a FLPE bottle or glass bottle.                          | Possibly high                  |
| 1742020-14     | GW-4B4-2-101617-(21)     | BAL-4100     | Methylarsonic acid      | 1.15          | ug/l         | 0.200          | 1.15           | U                    | UJ                        | MS/MSD recoveries below lower control limit of 75%   | MS/MSD recoveries both were 17%  | Low                            |
| 1742045-02     | GW-5D8-2-101717-(20)     | BAL-4100     | Arsenate Ion - As(O4)3- | 1.14          | ug/l         | 0.200          | 1.00           |                      | J                         | Concentration >2x, but < 5x concentration found in equipment blank   | Detected in equipment blank at 0.451 ug/L  | High                           |
| 1742045-05RE1  | GW-4E1-2-101817-(20)     | BAL-4100     | Arsenate Ion - As(O4)3- | 0.534         | ug/l         | 0.200          | 1.00           | J                    | U                         | Concentration <2x found in equipment blank   | Detected in equipment blank at 0.451 ug/L  | False positive                 |
| 1742045-11RE1  | GW-4F1-2-101817-(20)     | BAL-4100     | Arsenate Ion - As(O4)3- | 1.12          | ug/l         | 0.200          | 1.00           |                      | J                         | Concentration >2x, but < 5x concentration found in equipment blank   | Detected in equipment blank at 0.451 ug/L  | High                           |
| 1742045-12RE1  | GW-4F1-2-101817-(21)     | BAL-4100     | Arsenate Ion - As(O4)3- | 1.46          | ug/l         | 0.200          | 1.00           |                      | J                         | Concentration >2x, but < 5x concentration found in equipment blank   | Detected in equipment blank at 0.451 ug/L  | High                           |
| 1742045-13RE1  | EB-101817-(20)           | BAL-4100     | Arsenate Ion - As(O4)3- | 0.451         | ug/l         | 0.200          | 1.00           | J                    | J                         | Concentration is >MDL, <RL   | NA   | Low or high                    |
| 1743031-05     | GW-7E9-2-102317-(20)     | BAL-4100     | Arsenite Ion - As(O3)3- | 2.72          | ug/l         | 0.200          | 1.00           | M                    | J                         | RPD of laboratory replicate analysis above control limit of 25%  | RPD of 32%   | Low or high                    |
| 1744007-03     | GW-7I3-2-102717-(20)     | BAL-4100     | Arsenite Ion - As(O3)3- | 0.911         | ug/l         | 0.200          | 1.00           | J                    | J                         | Concentration is >MDL, <RL   | NA   | Low or high                    |
| 1744007-11RE2  | GW-131+00-1-102717-(20)  | EPA 1638 Mod | Sodium                  | 302000        | ug/l         | 30.2           | 60.0           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-02RE3  | GW-129+65-0-103017-(20)  | EPA 1638 Mod | Sodium                  | 5420000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-04RE3  | GW-128+30-0-103017-(20)  | EPA 1638 Mod | Sodium                  | 6540000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-06RE3  | GW-128+30-2-103017-(20)  | EPA 1638 Mod | Sodium                  | 3840000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-08RE3  | GW-129+65-2-103017-(20)  | EPA 1638 Mod | Sodium                  | 5190000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-10RE6  | GW-131+00-2-102717-(20)  | EPA 1638 Mod | Sodium                  | 6130000       | ug/l         | 408            | 4080           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-12RE5  | GW-126+90-2-103017-(20)  | EPA 1638 Mod | Sodium                  | 7020000       | ug/l         | 408            | 4080           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-14RE3  | GW-125+50-2-103017-(20)  | EPA 1638 Mod | Sodium                  | 6480000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-16RE3  | GW-124+00-2-103017-(20)  | EPA 1638 Mod | Sodium                  | 7530000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-18RE3  | GW-121+80-2-103017-(20)  | EPA 1638 Mod | Sodium                  | 4010000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-21RE3  | GW-129+65-1-103117-(20)  | EPA 1638 Mod | Sodium                  | 4920000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-23RE3  | GW-128+30-1-103117-(20)  | EPA 1638 Mod | Sodium                  | 6710000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-25RE3  | GW-125+50-1-103117-(20)  | EPA 1638 Mod | Sodium                  | 5510000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-27RE3  | GW-126+90-0-103117-(20)  | EPA 1638 Mod | Sodium                  | 4750000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-29RE3  | GW-125+50-0-103117-(20)  | EPA 1638 Mod | Sodium                  | 6530000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-31RE3  | GW-124+00-1-103117-(20)  | EPA 1638 Mod | Sodium                  | 7560000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744028-33RE3  | GW-124+00-0-103117-(20)  | EPA 1638 Mod | Sodium                  | 7410000       | ug/l         | 755            | 1500           | J-1                  | J                         | LCS recoveries above upper control limit of 130%   | LCS recoveries of 170% and 171%  | High                           |
| 1744050-02     | GW-126+90-3-103117-(20)  | BAL-4100     | Arsenate Ion - As(O4)3- | 0.456         | ug/l         | 0.200          | 1.00           | J                    | U                         | Concentration <2x found in equipment blank   | Detected in equipment blank at 0.272 ug/L  | False positive                 |
| 1744050-04     | GW-126+90-3-103117-(21)  | BAL-4100     | Arsenate Ion - As(O4)3- | 0.771         | ug/l         | 0.200          | 1.00           |                      | J                         | Concentration >2x, but < 5x concentration found in equipment blank   | Detected in equipment blank at 0.451 ug/L  | High                           |
| 1744050-15     | GW-4H4-2-110117-(20)     | BAL-4100     | Arsenate Ion - As(O4)3- | 1.00          | ug/l         | 0.200          | 1.00           | J-1, U               | UJ                        | Interfering peak noted by laboratory   | Small arsenic peak of unknown molecular identity present                             | Low or high                    |
| 1744050-24     | GW-5B1-3R-110217-(20)    | BAL-4100     | Arsenate Ion - As(O4)3- | 0.272         | ug/l         | 0.200          | 1.00           | J                    | U                         | Concentration <2x found in equipment blank   | Detected in equipment blank at 0.272 ug/L  | False positive                 |
| 1744050-26     | GW-4B2-3-110217-(20)     | BAL-4100     | Arsenate Ion - As(O4)3- | 0.272         | ug/l         | 0.200          | 1.00           | J                    | U                         | Concentration <2x found in equipment blank   | Detected in equipment blank at 0.272 ug/L  | False positive                 |
| 1746027-01     | EB-111517                | EPA 1631E    | Mercury                 | 0.61          | ng/l         | 0.10           | 0.40           | J-1                  | J                         | Mercury concentration in method blanks > RL  | All sample results < 10x method blank detection likely biased high                   | Likely high                    |
| 1746027-03     | PW-120+75-ST1-DS-111517  | EPA 1640 Mod | Lead<br>Nickel          | 7.49<br>3.38  | ug/l<br>ug/l | 0.101<br>0.141 | 0.303<br>0.606 |                      | J<br>J                    | Concentration >2x, but < 5x concentration found in equipment blank<br>Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.98 ug/L<br>Detected in equipment blank at 1.46 ug/L | High<br>High                   |

Table 2, continued

| Sample Number* | Laboratory Sample Number     | Method       | Chemical | Concentration | Units | MDL   | RL    | Data Validation      |           | Quality Control Reason   | Quality Control Result   | Possible Bias <sup>b,c,d</sup> |
|----------------|------------------------------|--------------|----------|---------------|-------|-------|-------|----------------------|-----------|--|--|--------------------------------|
|                |                              |              |          |               |       |       |       | Laboratory Data Flag | Qualifier |  |  |                                |
| 1746027-04     | PW-120+75-ST1-DS-111517-(20) | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 | U                    | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-04     |                              | EPA 1640 Mod | Nickel   | 3.37          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-04RE1  |                              | EPA 1631E    | Mercury  | 0.82          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-04RE1  |                              | EPA 1638 Mod | Copper   | 3.71          | ug/l  | 0.898 | 2.69  |                      | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.00 ug/L                           | High                           |
| 1746027-05     | PW-120+75-SW-111517          | EPA 1640 Mod | Lead     | 5.25          | ug/l  | 0.101 | 0.303 |                      | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.98 ug/L                           | High                           |
|                |                              |              | Nickel   | 1.48          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1/46 ug/L                           | False positive                 |
| 1746027-06     | PW-120+75-SW-111517-(20)     | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-06     |                              | EPA 1640 Mod | Nickel   | 3.37          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-06RE1  |                              | EPA 1631E    | Mercury  | 0.62          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-06RE1  |                              | EPA 1638 Mod | Copper   | 2.50          | ug/l  | 0.898 | 2.69  | J                    | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.0 ug/L                            | High                           |
| 1746027-07     | PW-122+60-0-DS-111517        | EPA 1640 Mod | Lead     | 8.98          | ug/l  | 0.101 | 0.303 |                      | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.98 ug/L                           | High                           |
| 1746027-08     | PW-122+60-0-DS-111517-(20)   | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-08     |                              | EPA 1640 Mod | Nickel   | 13.9          | ug/l  | 0.141 | 0.606 |                      | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 3.37 ug/L                           | High                           |
| 1746027-08RE2  |                              | EPA 1631E    | Mercury  | 1.06          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-09     | PW-124+00-0-DS-111517        | EPA 1640 Mod | Lead     | 2.26          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.98 ug/L                           | False positive                 |
| 1746027-09RE1  |                              | EPA 1631E    | Mercury  | 5.53          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-10     | PW-124+00-0-DS-111517-(20)   | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-10     |                              | EPA 1640 Mod | Nickel   | 3.37          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-10RE1  |                              | EPA 1638 Mod | Copper   | 3.41          | ug/l  | 0.898 | 2.69  |                      | J         |  |  |                                |
| 1746027-10RE2  |                              | EPA 1631E    | Mercury  | 1.06          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-11     | PW-125+00-ST1-DS-111517      | EPA 1640 Mod | Lead     | 19.1          | ug/l  | 0.101 | 0.303 | J-1                  | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.98 ug/L                           | High                           |
| 1746027-11RE1  |                              | EPA 1638 Mod | Copper   | 3.52          | ug/l  | 0.898 | 2.69  |                      | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.0 ug/L                            | High                           |
| 1746027-12     | PW-125+00-ST1-DS-111517-(20) | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-12     |                              | EPA 1640 Mod | Nickel   | 3.37          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-12RE1  |                              | EPA 1638 Mod | Copper   | 1.25          | ug/l  | 0.898 | 2.69  | J                    | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.0 ug/L                            | False positive                 |
| 1746027-12RE2  |                              | EPA 1631E    | Mercury  | 0.37          | ng/l  | 0.10  | 0.40  | J                    | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 0.28 ug/L                           | False positive                 |
| 1746027-13     | PW-125+00-SW-111517          | EPA 1640 Mod | Lead     | 1.98          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.98 ug/L                           | False positive                 |
| 1746027-13     |                              | EPA 1640 Mod | Nickel   | 1.46          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.46 ug/L                           | False positive                 |
| 1746027-14     | PW-125+00-SW-111517-(20)     | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 | J                    | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-14     |                              | EPA 1640 Mod | Nickel   | 3.37          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-14RE1  |                              | EPA 1638 Mod | Copper   | 2.13          | ug/l  | 0.898 | 2.69  | J                    | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.9 ug/L                            | High                           |
| 1746027-14RE2  |                              | EPA 1631E    | Mercury  | 0.28          | ng/l  | 0.10  | 0.40  | J                    | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 0.28 ug/L                           | False positive                 |
| 1746027-15     | PW-125+50-0-DS-111517        | EPA 1640 Mod | Lead     | 3.44          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.98 ug/L                           | False positive                 |
| 1746027-15     |                              | EPA 1640 Mod | Nickel   | 2.74          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.46 ug/L                           | False positive                 |
| 1746027-15RE1  |                              | EPA 1631E    | Mercury  | 6.30          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-16     | PW-125+50-0-DS-111517-(20)   | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-16     |                              | EPA 1640 Mod | Nickel   | 4.34          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-16RE1  |                              | EPA 1638 Mod | Copper   | 2.00          | ug/l  | 0.898 | 2.69  | J                    | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.9 ug/L                            | False positive                 |
| 1746027-16RE2  |                              | EPA 1631E    | Mercury  | 1.76          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-17     | PW-126+90-0-DS-111517        | EPA 1631E    | Mercury  | 3.89          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-17     |                              | EPA 1640 Mod | Lead     | 6.29          | ug/l  | 0.101 | 0.303 |                      | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.98 ug/L                           | High                           |
| 1746027-17     |                              | EPA 1640 Mod | Nickel   | 3.76          | ug/l  | 0.141 | 0.606 |                      | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.46 ug/L                           | High                           |
| 1746027-18     | PW-126+90-0-DS-111517-(20)   | EPA 1631E    | Mercury  | 0.64          | ng/l  | 0.10  | 0.40  | J-1                  | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-18     |                              | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-18     | 1746027-18RE1                | EPA 1640 Mod | Nickel   | 3.37          | ug/l  | 0.141 | 0.606 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-18RE1  |                              | EPA 1638 Mod | Copper   | 2.29          | ug/l  | 0.898 | 2.69  | J                    | J         | Concentration is >MDL, <RL   | NA   | Low or high                    |
| 1746027-19     | PW-128+30-0-DS-111517        | EPA 1640 Mod | Lead     | 1.98          | ug/l  | 0.101 | 0.303 |                      | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.98 ug/L                           | False positive                 |

Table 2, continued

| Sample Number* | Laboratory Sample Number     | Method       | Chemical | Concentration | Units | MDL   | RL    | Data Validation |           | Quality Control Reason   | Quality Control Result   | Possible Bias <sup>b,c,d</sup> |
|----------------|------------------------------|--------------|----------|---------------|-------|-------|-------|-----------------|-----------|--|--|--------------------------------|
|                |                              |              |          |               |       |       |       | Data Flag       | Qualifier |  |  |                                |
| 1746027-20     | PW-128+30-0-DS-111517-(20)   | EPA 1631E    | Mercury  | 0.97          | ng/l  | 0.10  | 0.40  | J-1             | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-20     |                              | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-20     |                              | EPA 1640 Mod | Nickel   | 12.9          | ug/l  | 0.141 | 0.606 |                 | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 3.37 ug/L                           | High                           |
| 1746027-20RE1  |                              | EPA 1638 Mod | Copper   | 2.72          | ug/l  | 0.898 | 2.69  |                 | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.0 ug/L                            | High                           |
| 1746027-20RE4  |                              | EPA 1638 Mod | Arsenic  | 3.39          | ug/l  | 1.12  | 4.08  | J               | J         | Concentration is >MDL, <RL   | NA   | Low or high                    |
| 1746027-21     | PW-128+50-ST1-DS-111517      | EPA 1631E    | Mercury  | 6.16          | ng/l  | 0.10  | 0.40  | J-1             | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-21     |                              | EPA 1640 Mod | Lead     | 2.19          | ug/l  | 0.101 | 0.303 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1/98 ug/L                           | False positive                 |
| 1746027-21     |                              | EPA 1640 Mod | Nickel   | 2.05          | ug/l  | 0.141 | 0.606 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.46 ug/L                           | False positive                 |
| 1746027-22     | PW-128+50-ST1-DS-111517-(20) | EPA 1631E    | Mercury  | 0.76          | ng/l  | 0.10  | 0.40  | J-1             | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-22     |                              | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-22     |                              | EPA 1640 Mod | Nickel   | 3.37          | ug/l  | 0.141 | 0.606 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-22RE1  |                              | EPA 1638 Mod | Copper   | 1.10          | ug/l  | 0.898 | 2.69  | J               | J         | Concentration is >MDL, <RL   | NA   | Low or high                    |
| 1746027-23     | PW-128+50-SW-111517          | EPA 1631E    | Mercury  | 1.55          | ng/l  | 0.10  | 0.40  | J-1             | J         | Mercury concentration in method blanks > RL                        | All sample results < 10x method blank detection likely biased high | Likely high                    |
| 1746027-23     |                              | EPA 1640 Mod | Lead     | 3.64          | ug/l  | 0.101 | 0.303 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.98 ug/L                           | False positive                 |
| 1746027-23     |                              | EPA 1640 Mod | Nickel   | 1.47          | ug/l  | 0.141 | 0.606 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 1.46 ug/L                           | False positive                 |
| 1746027-24     | PW-128+50-SW-111517-(20)     | EPA 1640 Mod | Lead     | 5.57          | ug/l  | 0.101 | 0.303 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 5.57 ug/L                           | False positive                 |
| 1746027-24     |                              | EPA 1640 Mod | Nickel   | 5.00          | ug/l  | 0.141 | 0.606 |                 | U         | Concentration <2x found in equipment blank                         | Detected in equipment blank at 3.37 ug/L                           | False positive                 |
| 1746027-24RE1  |                              | EPA 1638 Mod | Copper   | 4.27          | ug/l  | 0.898 | 2.69  | J               | J         | Concentration >2x, but < 5x concentration found in equipment blank | Detected in equipment blank at 1.0 ug/L                            | High                           |

Notes:  
 -(20) - Samples ending with -(20) are dissolved fractions  
 -(21) -Samples ending with -(21) are field duplicate dissolved fractions  
 As(III) - Arsenite Ion - As(O3)3-  
 As(V) - Arsenate Ion - As(O4)3-  
 EB -Samples beginning with EB are equipment blanks  
 HDPE - high density polyethylene  
 FLPE- fluorinated polyethylene  
 J - estimated  
 J-1 - estimated; see case narrative  
 LCS - laboratory control sample  
 M - laboratory duplicate precision (RPD) no within acceptance limit  
 MDL - method detection limit  
 MS - matrix spike  
 MS - matrix spike duplicate  
 R - rejected  
 RE1, RE2, RE3, RE4 - reanalysis (1,2,3, or 4)  
 RL - reporting limit  
 RPD - relative percent differences  
 U - undetected at detection limit shown

|                                |    |
|--------------------------------|----|
| Total results qualified "J" =  | 59 |
| Total results qualified "U" =  | 39 |
| Total results qualified "UJ" = | 2  |
| Total results qualified "R" =  | 0  |

\* Summary of qualified data is for natural and field quality control samples only  
<sup>a</sup>Low bias - concentration reported is exhibits low bias and the actual reporting limit or concentration may be greater than reported  
<sup>b</sup>High bias - result reported exhibits high bias and the actual reporting limit or concentration may be lower than reported  
<sup>c</sup>False positive - compound is likely not present

\* Data users must note that only data considered reportable during data validation has been reported. In several instances, multiple reanalyses may have been completed.  
 \* Data users should note that significant figures in above table are "as reported by the laboratory"; no rounding to more appropriate significant figures was completed during data validation  
 \* Data users should note that concentration highlighted in yellow are to show the restated as undetected concentration was elevated to the concentration found in the associated blank



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

December 20, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Revision 2:

The total recoverable and dissolved metals results for Cu, Ni, and Pb by EPA Method 1640, Mod. have been removed from this report. Instead, the total recoverable and dissolved Cu, Ni, and Pb results are reported using the EPA Method 1638, Mod.

Revision 1:

The sample IDs for the client samples were incorrectly transcribed in the initial report issued on November 28, 2017. In all cases the “**STI**” term in the sample ID should be reported as “**ST1**”. Also, in cases where the chain-of-custody (COC) form lists a suffix of “**(20)**”, the client has instructed that the suffix should be “**-(20)**”. In this revised report, these two changes were made to the sample IDs. No other changes were made with respect to the original report.

Mr. Troy Bussey,

On October 6, 2017, Brooks Applied Labs (BAL) received fourteen (14) water samples in acceptable condition. The samples were logged-in for the total recoverable and dissolved metals (aluminum [Al], arsenic [As], calcium [Ca], copper [Cu], iron [Fe], potassium [K], magnesium [Mg], manganese [Mg], sodium [Na], nickel [Ni], lead [Pb], and silicon [Si]) analyses via digestion and subsequent analysis by modified EPA Method 1638. The samples were logged-in for the total mercury [Hg] analysis by EPA Method 1631E. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The samples submitted for arsenic speciation and dissolved analyses were filtered in the field by the client.

The trace metals fraction for sample *PW-120+75-ST1-100517-(20)* arrived in a fluorinated high-density polyethylene (FLPE) bottle. Brooks Applied Labs recommends that samples undergoing trace metals analyses should be contained in a HDPE bottle. The FLPE bottles have not been lot tested for trace metals contamination.

The total mercury (Hg) fraction for sample *PW-130+75-ST1-100617* arrived in a high-density polyethylene (HDPE) bottle. Brooks Applied Labs (BAL) recommends that samples undergoing mercury analyses should be collected FLPE bottles or a glass bottles with FLPE-lined lids.



All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

Total Recoverable and Dissolved Metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, and Si) Analysis by EPA Method 1638, Mod.

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Total recoverable and dissolved metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, and Si) quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

The trace metals fraction for sample *PW-120+75-ST1-100517-(20)* arrived in a fluorinated high-density polyethylene (FLPE) bottle. Brooks Applied Labs recommends that samples undergoing trace metals analyses should be contained in a HDPE bottle. The FLPE bottles have not been lot tested for trace metals contamination.

**Batch B172756**

The dissolved arsenic result was greater than the corresponding total recoverable arsenic result for the client sample *PW-123+25-ST1-100517* (1741002-05 & 1741002-06). Re-analysis confirmed the results for samples 1741002-05 & 741002-06. The container labels were checked and there was no indication of miss-labeling. Since the dissolved arsenic result was in good agreement with the sum of species for the corresponding arsenic speciation sample, the dissolved arsenic result (1741002-06) is reported unqualified. The total recoverable arsenic result for sample 1741002-05 is qualified as estimated “J-1”.

The nickel relative percent difference (RPD) for the laboratory duplicate sample B172756-DUP5 was greater than the control limit of 20%, at 27%. However, secondary criteria were met (i.e. results were ≤ 5x the MRL and within one MRL of each other). Therefore, no data qualification was required.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were ≤ 25% of the native sample concentrations, the recoveries were not reported (**NR**).

**Batch B173137**

The dissolved Mg and Na results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values for total recoverable Mg and Na have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. For Mg, the MRL is set by a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the value of the corresponding MDL. Due to an elevated MDL, it was necessary to raise the Na MRL to 2 times the value of the MDL. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

**Total Mercury (Waters) Quantitation by EPA Method 1631E**

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

**Batch B172720**

The total mercury (Hg) fraction for sample *PW-130+75-ST1-100617* (1741002-13) arrived in a high-density polyethylene (HDPE) bottle. Brooks Applied Labs (BAL) recommends that samples undergoing mercury analyses should be collected in FLPE bottles or glass bottles with FLPE-lined lids. HDPE bottles are known to be permeable to mercury. Consequently, the total mercury result for sample *PW-130+75-ST1-100617* should be considered estimated and has been qualified as estimated "J-1". The corresponding dissolved mercury fraction was collected in an appropriate container; the dissolved Hg result for sample *PW-130+75-ST1-100617* is reported without qualification.

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

### Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

#### **Batch B172708**

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

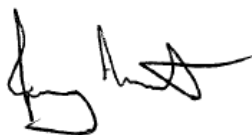
If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (**N/C**). Instances where the matrix spike/matrix spike duplicate (MS/MSD) sets were spiked at a concentration less than 25% of the native sample result, the recoveries were not reported (**NR**). Spike recoveries are not a valid indicator of data quality when the analyte concentration in the source sample is greater than the spiking level.

With the exceptions noted above, all data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,



Jeremy Maute  
Project Manager  
jeremy@brooksupplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| <b>Sample</b>                    | <b>Lab ID</b> | <b>Report Matrix</b> | <b>Type</b> | <b>Sampled</b> | <b>Received</b> |
|----------------------------------|---------------|----------------------|-------------|----------------|-----------------|
| <i>PW-119+25-ST1-100417</i>      | 1741002-01    | Water                | Sample      | 10/04/2017     | 10/06/2017      |
| <i>PW-119+25-ST1-100417-(20)</i> | 1741002-02    | Water                | Sample      | 10/04/2017     | 10/06/2017      |
| <i>PW-120+75-ST1-100517</i>      | 1741002-03    | Water                | Sample      | 10/05/2017     | 10/06/2017      |
| <i>PW-120+75-ST1-100517-(20)</i> | 1741002-04    | Water                | Sample      | 10/05/2017     | 10/06/2017      |
| <i>PW-123+25-ST1-100517</i>      | 1741002-05    | Water                | Sample      | 10/05/2017     | 10/06/2017      |
| <i>PW-123+25-ST1-100517-(20)</i> | 1741002-06    | Water                | Sample      | 10/05/2017     | 10/06/2017      |
| <i>PW-125+00-ST1-100517</i>      | 1741002-07    | Water                | Sample      | 10/05/2017     | 10/06/2017      |
| <i>PW-125+00-ST1-100517-(20)</i> | 1741002-08    | Water                | Sample      | 10/05/2017     | 10/06/2017      |
| <i>PW-126+80-ST1-100617</i>      | 1741002-09    | Water                | Sample      | 10/06/2017     | 10/06/2017      |
| <i>PW-126+80-ST1-100617-(20)</i> | 1741002-10    | Water                | Sample      | 10/06/2017     | 10/06/2017      |
| <i>PW-128+50-ST1-100617</i>      | 1741002-11    | Water                | Sample      | 10/06/2017     | 10/06/2017      |
| <i>PW-128+50-ST1-100617-(20)</i> | 1741002-12    | Water                | Sample      | 10/06/2017     | 10/06/2017      |
| <i>PW-130+75-ST1-100617</i>      | 1741002-13    | Water                | Sample      | 10/06/2017     | 10/06/2017      |
| <i>PW-130+75-ST1-100617-(20)</i> | 1741002-14    | Water                | Sample      | 10/06/2017     | 10/06/2017      |



## Batch Summary

| Analyte | Lab Matrix | Method       | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|--------------|------------|------------|---------|----------|
| Al      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| As      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| As(III) | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| As(V)   | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| Ca      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Cu      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| DMAs    | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| Fe      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Hg      | Water      | EPA 1631 E   | 10/11/2017 | 10/13/2017 | B172720 | 1701268  |
| Hg      | Water      | EPA 1631 E   | 10/11/2017 | 10/18/2017 | B172720 | 1701287  |
| K       | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Mg      | Water      | EPA 1638 Mod | 10/30/2017 | 11/18/2017 | B173137 | 1701442  |
| MMAAs   | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| Mn      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Na      | Water      | EPA 1638 Mod | 10/30/2017 | 11/18/2017 | B173137 | 1701442  |
| Ni      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Pb      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Si      | Water      | EPA 1638 Mod | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |



## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-119+25-ST1-100417</b>      |         |               |       |         |           |       |       |      |         |          |
| 1741002-01                       | As      | Water         | TR    | 7.31    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-01                       | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-01                       | Hg      | Water         | TR    | 0.34    | J         | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-01                       | Ni      | Water         | TR    | 0.439   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-01                       | Pb      | Water         | TR    | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| <b>PW-119+25-ST1-100417-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1741002-02                       | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1741002-02                       | As      | Water         | D     | 7.87    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-02                       | As(III) | Water         | D     | 3.86    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-02                       | As(V)   | Water         | D     | 4.11    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-02                       | Ca      | Water         | D     | 349000  |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1741002-02                       | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-02                       | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1741002-02                       | Fe      | Water         | D     | 1360    |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1741002-02                       | Hg      | Water         | D     | 0.34    | J         | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-02                       | K       | Water         | D     | 317000  |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1741002-02                       | Mg      | Water         | D     | 962000  |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1741002-02                       | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1741002-02                       | Mn      | Water         | D     | 306     |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1741002-02                       | Na      | Water         | D     | 9490000 |           | 1330  | 2650  | µg/L | B173137 | 1701442  |
| 1741002-02                       | Ni      | Water         | D     | 0.339   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-02                       | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1741002-02                       | Si      | Water         | D     | 10500   |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>PW-120+75-ST1-100517</b>      |         |               |       |         |           |       |       |      |         |          |
| 1741002-03                       | As      | Water         | TR    | 278     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-03                       | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-03                       | Hg      | Water         | TR    | 0.75    |           | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-03                       | Ni      | Water         | TR    | 1.03    | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-03                       | Pb      | Water         | TR    | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-120+75-ST1-100517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1741002-04                       | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1741002-04                       | As      | Water         | D     | 279     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-04                       | As(III) | Water         | D     | 55.9    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-04                       | As(V)   | Water         | D     | 34.8    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-04                       | Ca      | Water         | D     | 206000  |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1741002-04                       | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-04                       | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1741002-04                       | Fe      | Water         | D     | 32.5    | J         | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1741002-04                       | Hg      | Water         | D     | 0.69    |           | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-04                       | K       | Water         | D     | 201000  |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1741002-04                       | Mg      | Water         | D     | 536000  |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1741002-04                       | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1741002-04                       | Mn      | Water         | D     | 40.4    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1741002-04                       | Na      | Water         | D     | 8010000 |           | 1330  | 2650  | µg/L | B173137 | 1701442  |
| 1741002-04                       | Ni      | Water         | D     | 0.845   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-04                       | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1741002-04                       | Si      | Water         | D     | 13100   |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>PW-123+25-ST1-100517</b>      |         |               |       |         |           |       |       |      |         |          |
| 1741002-05                       | As      | Water         | TR    | 33.7    | J-1       | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-05                       | Cu      | Water         | TR    | 5.06    |           | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-05                       | Hg      | Water         | TR    | 17.6    |           | 0.51  | 2.04  | ng/L | B172720 | 1701268  |
| 1741002-05                       | Ni      | Water         | TR    | 2.92    |           | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-05                       | Pb      | Water         | TR    | 0.724   |           | 0.204 | 0.612 | µg/L | B172756 | 1701392  |





## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-123+25-ST1-100517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1741002-06                       | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1741002-06                       | As      | Water         | D     | 155     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-06                       | As(III) | Water         | D     | 76.7    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-06                       | As(V)   | Water         | D     | 83.5    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-06                       | Ca      | Water         | D     | 384000  |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1741002-06                       | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-06                       | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1741002-06                       | Fe      | Water         | D     | 55.1    |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1741002-06                       | Hg      | Water         | D     | 0.39    | J         | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-06                       | K       | Water         | D     | 360000  |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1741002-06                       | Mg      | Water         | D     | 1120000 |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1741002-06                       | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1741002-06                       | Mn      | Water         | D     | 61.7    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1741002-06                       | Na      | Water         | D     | 8430000 |           | 1330  | 2650  | µg/L | B173137 | 1701442  |
| 1741002-06                       | Ni      | Water         | D     | 0.690   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-06                       | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1741002-06                       | Si      | Water         | D     | 4610    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>PW-125+00-ST1-100517</b>      |         |               |       |         |           |       |       |      |         |          |
| 1741002-07                       | As      | Water         | TR    | 22.1    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-07                       | Cu      | Water         | TR    | 1.55    | J         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-07                       | Hg      | Water         | TR    | 5.26    |           | 0.51  | 2.04  | ng/L | B172720 | 1701287  |
| 1741002-07                       | Ni      | Water         | TR    | 1.04    | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-07                       | Pb      | Water         | TR    | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-125+00-ST1-100517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1741002-08                       | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1741002-08                       | As      | Water         | D     | 21.3    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-08                       | As(III) | Water         | D     | 1.26    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-08                       | As(V)   | Water         | D     | 18.4    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-08                       | Ca      | Water         | D     | 374000  |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1741002-08                       | Cu      | Water         | D     | 0.962   | J         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-08                       | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1741002-08                       | Fe      | Water         | D     | 73.4    |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1741002-08                       | Hg      | Water         | D     | 1.95    |           | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-08                       | K       | Water         | D     | 340000  |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1741002-08                       | Mg      | Water         | D     | 1080000 |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1741002-08                       | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1741002-08                       | Mn      | Water         | D     | 94.1    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1741002-08                       | Na      | Water         | D     | 8290000 |           | 1330  | 2650  | µg/L | B173137 | 1701442  |
| 1741002-08                       | Ni      | Water         | D     | 0.915   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-08                       | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1741002-08                       | Si      | Water         | D     | 4440    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>PW-126+80-ST1-100617</b>      |         |               |       |         |           |       |       |      |         |          |
| 1741002-09                       | As      | Water         | TR    | 2.47    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-09                       | Cu      | Water         | TR    | 1.49    | J         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-09                       | Hg      | Water         | TR    | 0.84    |           | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-09                       | Ni      | Water         | TR    | 0.886   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-09                       | Pb      | Water         | TR    | 0.299   | J         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-126+80-ST1-100617-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1741002-10                       | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1741002-10                       | As      | Water         | D     | 2.31    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-10                       | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-10                       | As(V)   | Water         | D     | 2.01    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-10                       | Ca      | Water         | D     | 405000  |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1741002-10                       | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-10                       | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1741002-10                       | Fe      | Water         | D     | 19.1    | J         | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1741002-10                       | Hg      | Water         | D     | 0.17    | J         | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-10                       | K       | Water         | D     | 374000  |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1741002-10                       | Mg      | Water         | D     | 1190000 |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1741002-10                       | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1741002-10                       | Mn      | Water         | D     | 23.6    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1741002-10                       | Na      | Water         | D     | 9080000 |           | 1330  | 2650  | µg/L | B173137 | 1701442  |
| 1741002-10                       | Ni      | Water         | D     | 0.475   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-10                       | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1741002-10                       | Si      | Water         | D     | 1890    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>PW-128+50-ST1-100617</b>      |         |               |       |         |           |       |       |      |         |          |
| 1741002-11                       | As      | Water         | TR    | 3.63    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-11                       | Cu      | Water         | TR    | 2.16    | J         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-11                       | Hg      | Water         | TR    | 0.80    |           | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-11                       | Ni      | Water         | TR    | 0.904   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-11                       | Pb      | Water         | TR    | 0.256   | J         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-128+50-ST1-100617-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1741002-12                       | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1741002-12                       | As      | Water         | D     | 3.10    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-12                       | As(III) | Water         | D     | 0.305   | J         | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-12                       | As(V)   | Water         | D     | 2.15    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-12                       | Ca      | Water         | D     | 391000  |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1741002-12                       | Cu      | Water         | D     | 0.948   | J         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-12                       | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1741002-12                       | Fe      | Water         | D     | 55.5    |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1741002-12                       | Hg      | Water         | D     | 0.27    | J         | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-12                       | K       | Water         | D     | 362000  |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1741002-12                       | Mg      | Water         | D     | 1050000 |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1741002-12                       | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1741002-12                       | Mn      | Water         | D     | 34.7    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1741002-12                       | Na      | Water         | D     | 9020000 |           | 1330  | 2650  | µg/L | B173137 | 1701442  |
| 1741002-12                       | Ni      | Water         | D     | 0.742   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-12                       | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1741002-12                       | Si      | Water         | D     | 2450    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>PW-130+75-ST1-100617</b>      |         |               |       |         |           |       |       |      |         |          |
| 1741002-13                       | As      | Water         | TR    | 2.68    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-13                       | Cu      | Water         | TR    | 2.18    | J         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-13                       | Hg      | Water         | TR    | 1.15    | J-1       | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-13                       | Ni      | Water         | TR    | 0.884   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-13                       | Pb      | Water         | TR    | 0.366   | J         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-130+75-ST1-100617-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1741002-14                       | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1741002-14                       | As      | Water         | D     | 2.16    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-14                       | As(III) | Water         | D     | 0.275   | J         | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-14                       | As(V)   | Water         | D     | 1.64    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1741002-14                       | Ca      | Water         | D     | 400000  |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1741002-14                       | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1741002-14                       | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1741002-14                       | Fe      | Water         | D     | 21.1    | J         | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1741002-14                       | Hg      | Water         | D     | 0.22    | J         | 0.10  | 0.41  | ng/L | B172720 | 1701287  |
| 1741002-14                       | K       | Water         | D     | 366000  |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1741002-14                       | Mg      | Water         | D     | 1170000 |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1741002-14                       | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1741002-14                       | Mn      | Water         | D     | 28.1    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1741002-14                       | Na      | Water         | D     | 8620000 |           | 1330  | 2650  | µg/L | B173137 | 1701442  |
| 1741002-14                       | Ni      | Water         | D     | 0.584   | J         | 0.245 | 1.63  | µg/L | B172756 | 1701392  |
| 1741002-14                       | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1741002-14                       | Si      | Water         | D     | 2070    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |



## Accuracy & Precision Summary

Batch: B172708  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.034  | µg/L  | 100% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.950  | µg/L  | 99% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.916  | µg/L  | 91% 75-125   |              |
| B172708-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMA   |        | 4.634 | 4.697  | µg/L  | 101% 75-125  |              |
| B172708-DUP1 | <b>Duplicate, (1741002-14)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 0.275  |       | 0.258  | µg/L  |              | 7% 25        |
|              | As(V)                                       | 1.644  |       | 1.594  | µg/L  |              | 3% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMA   | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172708-MS1  | <b>Matrix Spike, (1741002-14)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 0.275  | 50.00 | 52.22  | µg/L  | 104% 75-125  |              |
|              | As(V)                                       | 1.644  | 50.00 | 51.18  | µg/L  | 99% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 54.15  | µg/L  | 106% 75-125  |              |
|              | MMA   | ND     | 50.00 | 52.03  | µg/L  | 104% 75-125  |              |
| B172708-MSD1 | <b>Matrix Spike Duplicate, (1741002-14)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 0.275  | 50.00 | 53.42  | µg/L  | 106% 75-125  | 2% 25        |
|              | As(V)                                       | 1.644  | 50.00 | 52.26  | µg/L  | 101% 75-125  | 2% 25        |
|              | DMAs  | ND     | 51.00 | 55.26  | µg/L  | 108% 75-125  | 2% 25        |
|              | MMA   | ND     | 50.00 | 52.47  | µg/L  | 105% 75-125  | 0.9% 25      |



## Accuracy & Precision Summary

Batch: B172720  
 Lab Matrix: Water  
 Method: EPA 1631 E

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172720-SRM1 | Standard Reference Material (1741007, THg SRM NIST 1641d)<br>Hg |        | 15.68 | 15.55  | ng/L  | 99% 80-120   |              |
| B172720-MS7  | Matrix Spike (1741002-01)<br>Hg                                 | 0.34   | 10.20 | 9.82   | ng/L  | 93% 71-125   |              |
| B172720-MSD7 | Matrix Spike Duplicate (1741002-01)<br>Hg                       | 0.34   | 10.20 | 10.37  | ng/L  | 98% 71-125   | 5% 24        |
| B172720-MS8  | Matrix Spike (1741002-07)<br>Hg                                 | 5.26   | 20.41 | 25.44  | ng/L  | 99% 71-125   |              |
| B172720-MSD8 | Matrix Spike Duplicate (1741002-07)<br>Hg                       | 5.26   | 20.41 | 25.74  | ng/L  | 100% 71-125  | 1% 24        |



## Accuracy & Precision Summary

Batch: B172756  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte   | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|--------|--------|-------|--------------|--------------|
| <b>B172756-BS1</b>  | <b>Blank Spike, (1738012)</b>                             |        |        |        |       |              |              |
|                     | Al  |        | 396.8  | 386.4  | µg/L  | 97% 75-125   |              |
|                     | As  |        | 19.84  | 19.76  | µg/L  | 100% 75-125  |              |
|                     | Ca  |        | 396.8  | 401.1  | µg/L  | 101% 75-125  |              |
|                     | Cu  |        | 19.84  | 20.43  | µg/L  | 103% 75-125  |              |
|                     | Fe  |        | 396.8  | 397.2  | µg/L  | 100% 75-125  |              |
|                     | K   |        | 396.8  | 390.1  | µg/L  | 98% 75-125   |              |
|                     | Mn  |        | 19.84  | 19.95  | µg/L  | 101% 75-125  |              |
|                     | Ni  |        | 19.84  | 20.37  | µg/L  | 103% 75-125  |              |
|                     | Pb  |        | 1.984  | 2.142  | µg/L  | 108% 75-125  |              |
| <b>B172756-BS2</b>  | <b>Blank Spike, (1738012)</b>                             |        |        |        |       |              |              |
|                     | Al  |        | 396.8  | 392.2  | µg/L  | 99% 75-125   |              |
|                     | As  |        | 19.84  | 19.59  | µg/L  | 99% 75-125   |              |
|                     | Ca  |        | 396.8  | 402.8  | µg/L  | 102% 75-125  |              |
|                     | Cu  |        | 19.84  | 20.56  | µg/L  | 104% 75-125  |              |
|                     | Fe  |        | 396.8  | 398.9  | µg/L  | 101% 75-125  |              |
|                     | K   |        | 396.8  | 389.9  | µg/L  | 98% 75-125   |              |
|                     | Mn  |        | 19.84  | 20.12  | µg/L  | 101% 75-125  |              |
|                     | Ni  |        | 19.84  | 20.50  | µg/L  | 103% 75-125  |              |
|                     | Pb  |        | 1.984  | 2.088  | µg/L  | 105% 75-125  |              |
| <b>B172756-BS3</b>  | <b>Blank Spike, (1744018)</b>                             |        |        |        |       |              |              |
|                     | Si  |        | 400.0  | 364.8  | µg/L  | 91% 75-125   |              |
| <b>B172756-SRM1</b> | <b>Standard Reference Material (1724009, T221 as SRM)</b> |        |        |        |       |              |              |
|                     | Al  |        | 374.0  | 374.6  | µg/L  | 100% 75-125  |              |
|                     | As  |        | 17.70  | 17.63  | µg/L  | 100% 75-125  |              |
|                     | Ca  |        | 16700  | 16860  | µg/L  | 101% 75-125  |              |
|                     | Cu  |        | 3.780  | 3.909  | µg/L  | 103% 75-125  |              |
|                     | Fe  |        | 328.0  | 323.4  | µg/L  | 99% 75-125   |              |
|                     | K   |        | 1900   | 1868   | µg/L  | 98% 75-125   |              |
|                     | Mn  |        | 33.60  | 33.24  | µg/L  | 99% 75-125   |              |
|                     | Ni  |        | 0.6000 | 0.471  | µg/L  | 78% 75-125   |              |
|                     | Pb  |        | 0.4900 | 0.474  | µg/L  | 97% 75-125   |              |
|                     | Si  |        | 5843   | 5898   | µg/L  | 101% 75-125  |              |





## Accuracy & Precision Summary

Batch: B172756  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|--|--------|-------|--------|-------|--------------|--------------|
| <b>B172756-SRM2</b> | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |        |       |        |       |              |              |
|                     | Al   |        | 53.00 | 51.81  | µg/L  | 98% 75-125   |              |
|                     | As   |        | 8.075 | 7.961  | µg/L  | 99% 75-125   |              |
|                     | Ca   |        | 5615  | 5382   | µg/L  | 96% N/A      |              |
|                     | Cu   |        | 85.75 | 87.42  | µg/L  | 102% 75-125  |              |
|                     | Fe   |        | 36.80 | 35.94  | µg/L  | 98% 75-125   |              |
|                     | K  |        | 579.9 | 578.2  | µg/L  | 100% 0-200   |              |
|                     | Mn   |        | 40.39 | 38.56  | µg/L  | 95% 75-125   |              |
|                     | Ni   |        | 25.32 | 25.97  | µg/L  | 103% 75-125  |              |
|                     | Pb   |        | 12.10 | 12.57  | µg/L  | 104% 75-125  |              |
|                     | Si   |        | 5210  | 5054   | µg/L  | 97% N/A      |              |
| <b>B172756-DUP5</b> | <b>Duplicate, (1741002-01)</b>                                       |        |       |        |       |              |              |
|                     | Al   | 56.35  |       | 59.03  | µg/L  |              | 5% 20        |
|                     | As   | 7.310  |       | 7.414  | µg/L  |              | 1% 20        |
|                     | Ca   | 351600 |       | 356400 | µg/L  |              | 1% 20        |
|                     | Cu   | ND     |       | ND     | µg/L  |              | N/C 20       |
|                     | Fe   | 1416   |       | 1444   | µg/L  |              | 2% 20        |
|                     | K  | 308200 |       | 317700 | µg/L  |              | 3% 20        |
|                     | Mn   | 312.9  |       | 316.0  | µg/L  |              | 1% 20        |
|                     | Ni   | 0.439  |       | 0.336  | µg/L  |              | 27% 20       |
|                     | Pb   | ND     |       | ND     | µg/L  |              | N/C 20       |
|                     | Si   | 10420  |       | 10830  | µg/L  |              | 4% 20        |
| <b>B172756-MS5</b>  | <b>Matrix Spike, (1741002-01)</b>                                    |        |       |        |       |              |              |
|                     | Al   | 56.35  | 4082  | 4417   | µg/L  | 107% 75-125  |              |
|                     | As   | 7.310  | 408.2 | 438.8  | µg/L  | 106% 75-125  |              |
|                     | Ca   | 351600 | 4082  | 354900 | µg/L  | NR 75-125    |              |
|                     | Cu   | ND     | 408.2 | 407.0  | µg/L  | 100% 75-125  |              |
|                     | Fe   | 1416   | 4082  | 5475   | µg/L  | 99% 75-125   |              |
|                     | K  | 308200 | 4082  | 318600 | µg/L  | NR 75-125    |              |
|                     | Mn   | 312.9  | 408.2 | 734.6  | µg/L  | 103% 75-125  |              |
|                     | Ni   | 0.439  | 408.2 | 417.9  | µg/L  | 102% 75-125  |              |
|                     | Pb   | ND     | 40.82 | 40.10  | µg/L  | 98% 75-125   |              |
|                     | Si   | 10420  | 40820 | 56580  | µg/L  | 113% 75-125  |              |



## Accuracy & Precision Summary

Batch: B172756  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B172756-MSD5</b> | <b>Matrix Spike Duplicate, (1741002-01)</b> |        |       |        |       |              |              |
|                     | Al  | 56.35  | 4082  | 4566   | µg/L  | 110% 75-125  | 3% 20        |
|                     | As  | 7.310  | 408.2 | 441.0  | µg/L  | 106% 75-125  | 0.5% 20      |
|                     | Ca  | 351600 | 4082  | 345600 | µg/L  | NR 75-125    | N/C 20       |
|                     | Cu  | ND     | 408.2 | 416.7  | µg/L  | 102% 75-125  | 2% 20        |
|                     | Fe  | 1416   | 4082  | 5508   | µg/L  | 100% 75-125  | 0.6% 20      |
|                     | K   | 308200 | 4082  | 312700 | µg/L  | NR 75-125    | N/C 20       |
|                     | Mn  | 312.9  | 408.2 | 747.1  | µg/L  | 106% 75-125  | 2% 20        |
|                     | Ni  | 0.439  | 408.2 | 421.7  | µg/L  | 103% 75-125  | 0.9% 20      |
|                     | Pb  | ND     | 40.82 | 39.41  | µg/L  | 97% 75-125   | 2% 20        |
|                     | Si  | 10420  | 40820 | 56950  | µg/L  | 114% 75-125  | 0.6% 20      |
| <b>B172756-DUP6</b> | <b>Duplicate, (1741002-07)</b>              |        |       |        |       |              |              |
|                     | Al  | 107.2  |       | 108.6  | µg/L  |              | 1% 20        |
|                     | As  | 22.12  |       | 22.00  | µg/L  |              | 0.6% 20      |
|                     | Ca  | 371400 |       | 371600 | µg/L  |              | 0.05% 20     |
|                     | Cu  | 1.551  |       | 1.518  | µg/L  |              | 2% 20        |
|                     | Fe  | 177.0  |       | 177.5  | µg/L  |              | 0.3% 20      |
|                     | K   | 338200 |       | 340700 | µg/L  |              | 0.7% 20      |
|                     | Mn  | 96.34  |       | 96.75  | µg/L  |              | 0.4% 20      |
|                     | Ni  | 1.042  |       | 1.066  | µg/L  |              | 2% 20        |
|                     | Pb  | ND     |       | ND     | µg/L  |              | N/C 20       |
|                     | Si  | 4633   |       | 4635   | µg/L  |              | 0.03% 20     |
| <b>B172756-MS6</b>  | <b>Matrix Spike, (1741002-07)</b>           |        |       |        |       |              |              |
|                     | Al  | 107.2  | 4082  | 4486   | µg/L  | 107% 75-125  |              |
|                     | As  | 22.12  | 408.2 | 448.1  | µg/L  | 104% 75-125  |              |
|                     | Ca  | 371400 | 4082  | 373600 | µg/L  | NR 75-125    |              |
|                     | Cu  | 1.551  | 408.2 | 402.4  | µg/L  | 98% 75-125   |              |
|                     | Fe  | 177.0  | 4082  | 4160   | µg/L  | 98% 75-125   |              |
|                     | K   | 338200 | 4082  | 337600 | µg/L  | NR 75-125    |              |
|                     | Mn  | 96.34  | 408.2 | 508.2  | µg/L  | 101% 75-125  |              |
|                     | Ni  | 1.042  | 408.2 | 411.1  | µg/L  | 100% 75-125  |              |
|                     | Pb  | ND     | 40.82 | 37.42  | µg/L  | 92% 75-125   |              |
|                     | Si  | 4633   | 40820 | 49730  | µg/L  | 110% 75-125  |              |



## Accuracy & Precision Summary

**Batch:** B172756  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample       | Analyte                                     | Native | Spike  | Result | Units  | REC & Limits | RPD & Limits |         |
|--------------|---|--------|--------|--------|--------|--------------|--------------|---------|
| B172756-MSD6 | <b>Matrix Spike Duplicate, (1741002-07)</b> |        |        |        |        |              |              |         |
|              |   | Al     | 107.2  | 4082   | 4514   | µg/L         | 108% 75-125  | 0.6% 20 |
|              |   | As     | 22.12  | 408.2  | 453.1  | µg/L         | 106% 75-125  | 1% 20   |
|              |   | Ca     | 371400 | 4082   | 377500 | µg/L         | NR 75-125    | N/C 20  |
|              |   | Cu     | 1.551  | 408.2  | 410.4  | µg/L         | 100% 75-125  | 2% 20   |
|              |   | Fe     | 177.0  | 4082   | 4222   | µg/L         | 99% 75-125   | 1% 20   |
|              |   | K      | 338200 | 4082   | 338200 | µg/L         | NR 75-125    | N/C 20  |
|              |   | Mn     | 96.34  | 408.2  | 516.0  | µg/L         | 103% 75-125  | 2% 20   |
|              |   | Ni     | 1.042  | 408.2  | 420.0  | µg/L         | 103% 75-125  | 2% 20   |
|              |   | Pb     | ND     | 40.82  | 38.28  | µg/L         | 94% 75-125   | 2% 20   |
|              |   | Si     | 4633   | 40820  | 50300  | µg/L         | 112% 75-125  | 1% 20   |



## Accuracy & Precision Summary

Batch: B173137  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte  | Native  | Spike  | Result  | Units | REC & Limits | RPD & Limits |
|--------------|--|---------|--------|---------|-------|--------------|--------------|
| B173137-BS1  | <b>Blank Spike, (1738012)</b>  |         |        |         |       |              |              |
|              | Mg   |         | 400.0  | 379.7   | µg/L  | 95% 75-125   |              |
|              | Na   |         | 400.0  | 383.8   | µg/L  | 96% 75-125   |              |
| B173137-BS2  | <b>Blank Spike, (1738012)</b>  |         |        |         |       |              |              |
|              | Mg   |         | 400.0  | 385.7   | µg/L  | 96% 75-125   |              |
|              | Na   |         | 400.0  | 387.8   | µg/L  | 97% 75-125   |              |
| B173137-SRM1 | <b>Standard Reference Material (1724009, T221 as SRM)</b>            |         |        |         |       |              |              |
|              | Mg   |         | 3770   | 3641    | µg/L  | 97% 75-125   |              |
|              | Na   |         | 17400  | 16960   | µg/L  | 97% 75-125   |              |
| B173137-SRM2 | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |         |        |         |       |              |              |
|              | Mg   |         | 1059   | 994.5   | µg/L  | 94% N/A      |              |
|              | Na   |         | 3137   | 2968    | µg/L  | 95% N/A      |              |
| B173137-DUP3 | <b>Duplicate, (1741002-10)</b>                                       |         |        |         |       |              |              |
|              | Mg   | 1186000 |        | 1173000 | µg/L  |              | 1% 20        |
| B173137-MS3  | <b>Matrix Spike, (1741002-10)</b>                                    |         |        |         |       |              |              |
|              | Mg   | 1186000 | 20410  | 1185000 | µg/L  | NR 75-125    |              |
| B173137-MSD3 | <b>Matrix Spike Duplicate, (1741002-10)</b>                          |         |        |         |       |              |              |
|              | Mg   | 1186000 | 20410  | 1199000 | µg/L  | NR 75-125    | N/C 20       |
| B173137-DUP1 | <b>Duplicate, (1741002-14)</b>                                       |         |        |         |       |              |              |
|              | Na   | 8620000 |        | 8370000 | µg/L  |              | 3% 20        |
| B173137-MS1  | <b>Matrix Spike, (1741002-14)</b>                                    |         |        |         |       |              |              |
|              | Na   | 8620000 | 204100 | 8954000 | µg/L  | NR 75-125    |              |
| B173137-MSD1 | <b>Matrix Spike Duplicate, (1741002-14)</b>                          |         |        |         |       |              |              |
|              | Na   | 8620000 | 204100 | 8707000 | µg/L  | NR 75-125    | N/C 20       |



## Method Blanks & Reporting Limits

**Batch:** B172708  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172708-BLK1    | 0.00         | µg/L  |                   |
| B172708-BLK2    | 0.00         | µg/L  |                   |
| B172708-BLK3    | 0.00         | µg/L  |                   |
| B172708-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B172708-BLK1    | -0.00004      | µg/L  |                   |
| B172708-BLK2    | -0.0007       | µg/L  |                   |
| B172708-BLK3    | -0.0005       | µg/L  |                   |
| B172708-BLK4    | -0.003        | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b>  |       | <b>MRL: 0.020</b> |

**Analyte:** DMA<sub>s</sub>

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172708-BLK1    | 0.00         | µg/L  |                   |
| B172708-BLK2    | 0.00         | µg/L  |                   |
| B172708-BLK3    | 0.00         | µg/L  |                   |
| B172708-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172708-BLK1    | 0.00          | µg/L         |                   |
| B172708-BLK2    | 0.00          | µg/L         |                   |
| B172708-BLK3    | 0.00          | µg/L         |                   |
| B172708-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL:</b> 0.023 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B172720  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample          | Result       | Units |                            |             |
|-----------------|--------------|-------|----------------------------|-------------|
| B172720-BLK1    | -0.12        | ng/L  |                            |             |
| B172720-BLK2    | -0.10        | ng/L  |                            |             |
| B172720-BLK3    | -0.11        | ng/L  |                            |             |
| B172720-BLK4    | -0.10        | ng/L  |                            |             |
| <b>Average:</b> | <b>-0.11</b> |       | <b>Standard Deviation:</b> | <b>0.01</b> |
| <b>Limit:</b>   | <b>0.50</b>  |       | <b>Limit:</b>              | <b>0.10</b> |
|                 |              |       | <b>MDL:</b>                | <b>0.10</b> |
|                 |              |       | <b>MRL:</b>                | <b>0.40</b> |



## Method Blanks & Reporting Limits

**Batch:** B172756  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Al

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.041        | µg/L  |                   |
| B172756-BLK2    | -0.0006      | µg/L  |                   |
| B172756-BLK3    | 0.007        | µg/L  |                   |
| B172756-BLK4    | 0.039        | µg/L  |                   |
| <b>Average:</b> | <b>0.022</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>2.000</b> |       | <b>MRL: 2.00</b>  |

**Analyte:** As

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.0004       | µg/L  |                   |
| B172756-BLK2    | 0.0004       | µg/L  |                   |
| B172756-BLK3    | 0.0006       | µg/L  |                   |
| B172756-BLK4    | 0.0002       | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.011</b> |
| <b>Limit:</b>   | <b>0.040</b> |       | <b>MRL: 0.040</b> |

**Analyte:** Ca

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B172756-BLK1    | 0.525         | µg/L  |                  |
| B172756-BLK2    | -0.037        | µg/L  |                  |
| B172756-BLK3    | -0.027        | µg/L  |                  |
| B172756-BLK4    | -0.041        | µg/L  |                  |
| <b>Average:</b> | <b>0.105</b>  |       | <b>MDL: 4.60</b> |
| <b>Limit:</b>   | <b>13.800</b> |       | <b>MRL: 13.8</b> |





## Method Blanks & Reporting Limits

### Analyte: Cu

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.007        | µg/L  |                   |
| B172756-BLK2    | 0.005        | µg/L  |                   |
| B172756-BLK3    | 0.006        | µg/L  |                   |
| B172756-BLK4    | 0.007        | µg/L  |                   |
| <b>Average:</b> | <b>0.006</b> |       | <b>MDL: 0.022</b> |
| <b>Limit:</b>   | <b>0.066</b> |       | <b>MRL: 0.066</b> |

### Analyte: Fe

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B172756-BLK1    | 0.06        | µg/L  |                  |
| B172756-BLK2    | 0.02        | µg/L  |                  |
| B172756-BLK3    | 0.02        | µg/L  |                  |
| B172756-BLK4    | 0.01        | µg/L  |                  |
| <b>Average:</b> | <b>0.03</b> |       | <b>MDL: 0.28</b> |
| <b>Limit:</b>   | <b>0.85</b> |       | <b>MRL: 0.85</b> |

### Analyte: K

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B172756-BLK1    | -0.09       | µg/L  |                  |
| B172756-BLK2    | -0.09       | µg/L  |                  |
| B172756-BLK3    | -0.07       | µg/L  |                  |
| B172756-BLK4    | -0.1        | µg/L  |                  |
| <b>Average:</b> | <b>-0.1</b> |       | <b>MDL: 2.4</b>  |
| <b>Limit:</b>   | <b>10.0</b> |       | <b>MRL: 10.0</b> |

### Analyte: Mn

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.004        | µg/L  |                   |
| B172756-BLK2    | -0.00003     | µg/L  |                   |
| B172756-BLK3    | 0.003        | µg/L  |                   |
| B172756-BLK4    | 0.002        | µg/L  |                   |
| <b>Average:</b> | <b>0.002</b> |       | <b>MDL: 0.021</b> |
| <b>Limit:</b>   | <b>0.063</b> |       | <b>MRL: 0.063</b> |



## Method Blanks & Reporting Limits

### Analyte: Ni

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.003        | µg/L  |                   |
| B172756-BLK2    | 0.004        | µg/L  |                   |
| B172756-BLK3    | 0.002        | µg/L  |                   |
| B172756-BLK4    | 0.002        | µg/L  |                   |
| <b>Average:</b> | <b>0.003</b> |       | <b>MDL: 0.006</b> |
| <b>Limit:</b>   | <b>0.040</b> |       | <b>MRL: 0.040</b> |

### Analyte: Pb

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.0004       | µg/L  |                   |
| B172756-BLK2    | 0.0003       | µg/L  |                   |
| B172756-BLK3    | 0.0003       | µg/L  |                   |
| B172756-BLK4    | -0.00005     | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.015</b> |       | <b>MRL: 0.015</b> |

### Analyte: Si

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B172756-BLK1    | 0.22         | µg/L  |                  |
| B172756-BLK2    | -0.001       | µg/L  |                  |
| B172756-BLK3    | -0.15        | µg/L  |                  |
| B172756-BLK4    | -0.32        | µg/L  |                  |
| <b>Average:</b> | <b>-0.06</b> |       | <b>MDL: 0.75</b> |
| <b>Limit:</b>   | <b>4.00</b>  |       | <b>MRL: 4.00</b> |



## Method Blanks & Reporting Limits

**Batch:** B173137  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Mg

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173137-BLK1    | 0.03        | µg/L  |                  |
| B173137-BLK2    | 0.02        | µg/L  |                  |
| B173137-BLK3    | 0.05        | µg/L  |                  |
| B173137-BLK4    | 0.02        | µg/L  |                  |
| <b>Average:</b> | <b>0.03</b> |       | <b>MDL: 0.54</b> |
| <b>Limit:</b>   | <b>1.70</b> |       | <b>MRL: 1.70</b> |

**Analyte:** Na

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173137-BLK1    | -0.402        | µg/L  |                   |
| B173137-BLK2    | -0.219        | µg/L  |                   |
| B173137-BLK3    | -0.405        | µg/L  |                   |
| B173137-BLK4    | -0.418        | µg/L  |                   |
| <b>Average:</b> | <b>-0.361</b> |       | <b>MDL: 0.650</b> |
| <b>Limit:</b>   | <b>1.300</b>  |       | <b>MRL: 1.30</b>  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741002-01           |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/04/2017 |                    |
|-------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-119+25-ST1-100417 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B                                   | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C                                   | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |

| <b>Lab ID:</b> 1741002-02                |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/04/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-119+25-ST1-100417-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                               | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B  | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C  | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |
| D  | Vacutainer              | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |
| E  | EXTRA_VOL               | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |

| <b>Lab ID:</b> 1741002-03           |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/05/2017 |                    |
|-------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-120+75-ST1-100517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B                                   | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C                                   | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741002-04                |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/05/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-120+75-ST1-100517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                               | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B  | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C  | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |
| D  | Vacutainer              | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |
| E  | EXTRA_VOL               | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |

| <b>Lab ID:</b> 1741002-05           |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/05/2017 |                    |
|-------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-123+25-ST1-100517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B                                   | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C                                   | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741002-06                |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/05/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-123+25-ST1-100517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                               | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B  | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C  | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |
| D  | Vacutainer              | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |
| E  | EXTRA_VOL               | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |

| <b>Lab ID:</b> 1741002-07           |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/05/2017 |                    |
|-------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-125+00-ST1-100517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B                                   | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C                                   | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741002-08                |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/05/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-125+00-ST1-100517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                               | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B  | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C  | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |
| D  | Vacutainer              | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |
| E  | EXTRA_VOL               | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |

| <b>Lab ID:</b> 1741002-09           |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/06/2017 |                    |
|-------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-126+80-ST1-100617 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B                                   | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C                                   | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741002-10                |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/06/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-126+80-ST1-100617-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                               | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B  | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C  | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |
| D  | Vacutainer              | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |
| E  | EXTRA_VOL               | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |

| <b>Lab ID:</b> 1741002-11           |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/06/2017 |                    |
|-------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-128+50-ST1-100617 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B                                   | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C                                   | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741002-12                |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/06/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-128+50-ST1-100617-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                               | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B  | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C  | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |
| D  | Vacutainer              | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |
| E  | EXTRA_VOL               | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |

| <b>Lab ID:</b> 1741002-13           |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/06/2017 |                    |
|-------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-130+75-ST1-100617 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B                                   | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C                                   | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741002 Rev 2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741002-14                |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/06/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-130+75-ST1-100617-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/06/2017  |                    |
| <b>Des</b>                               | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 125 mL      | 15-0002                     | none                   |              |                              | Cooler - 1741002   |
| B  | Bottle HDPE ICP-W       | 125 mL      | 17-0202                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1741002   |
| C  | Bottle HDPE ICP-ChelCol | 60 mL       | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1741002   |
| D  | Vacutainer              | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |
| E  | EXTRA_VOL               | 6 mL        | 16-0247                     | EDTA (PP)              | n/a          | n/a                          | Cooler - 1741002   |

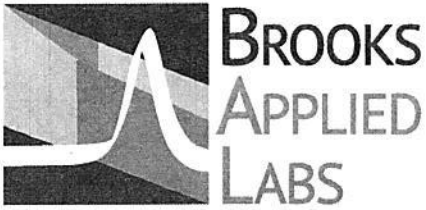
## Shipping Containers

### **Cooler - 1741002**

**Received:** October 6, 2017 14:30  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 5.5 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#14

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: Lawson For BAL use only Date: 10/6/17

Work Order ID: 1741002 Time: 1430

Project ID: \_\_\_\_\_

Mail Invoice to:

Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to:

Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes

BAL PM: Jeremy Maute

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

| Requested TAT (business days)<br><input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Collection                |                   | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |  |  | Comments<br><br>Specify Here |                                      |
|---|---------------------------|-------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|--|--|------------------------------|--------------------------------------|
|   | Date                      | Time              | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DIMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |                              | Note: Field conductivity measurement |
| Sample ID   |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |  |  |                              |                                      |
| 1   | PW-119+25-ST1-100A17      | 10/4/17           | 1130                            | Water                | 3               | N                 |  |   |   | X   |   |  |  | 42 MS/cm                     |                                      |
| 2   | PW-119+25-ST1-100A17 (20) | ↓                 | 1130                            | ↓                    | 5               | Y                 |  |   |   |   | X   | X  | X  | 42 MS/cm                     |                                      |
| 3   | PW-120+75-ST1-100S17      | 10/5/17           | 0830                            | ↓                    | 3               | N                 |  |   |   | X   |   |  |  | 35 MS/cm                     |                                      |
| 4   | PW-120+75-ST1-100S17 (20) | ↓                 | 0830                            | ↓                    | 5               | Y                 |  |   |   |   | X   | X  | X  | 35 MS/cm                     |                                      |
| 5   | PW-123+25-ST1-100S17      | ↓                 | 1015                            | ↓                    | 3               | N                 |  |   |   | X   |   |  |  | 38 MS/cm                     |                                      |
| 6   | PW-123+25-ST1-100S17 (20) | ↓                 | 1015                            | ↓                    | 5               | Y                 |  |   |   |   | X   | X  | X  | 38 MS/cm                     |                                      |
| 7   | PW-125+00-ST1-100S17      | ↓                 | 1300                            | ↓                    | 3               | N                 |  |   |   | X   |   |  |  | 37 MS/cm                     |                                      |
| 8   | PW-125+00-ST1-100S17 (20) | ↓                 | 1300                            | ↓                    | 5               | Y                 |  |   |   |   | X   | X  | X  | 37 MS/cm                     |                                      |
| 9   | PW-126+80-ST1-100B17      | 10/6/17           | 8:30                            | ↓                    | 3               | N                 |  |   |   | X   |   |  |  | 40 MS/cm                     |                                      |
| 10  | PW-126+80-ST1-100B17 (20) | ↓                 | 8:30                            | ↓                    | 5               | Y                 |  |   |   |   | X   | X  | X  | 40 MS/cm                     |                                      |
| Trip Blank (specify)  |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |  |  |                              |                                      |
| Relinquished By: <u>Lawson</u>  | Date: <u>10/6/17</u>      | Time: <u>1430</u> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |  |  |                              |                                      |
| Received By: _____  | Date: _____               | Time: _____       | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |  |  |                              |                                      |

Print



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: [Signature] For BAL use only Date: 10/6/17

Work Order ID: 1741002 Time: 1430

Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection                |                   | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |
|--|---------------------------|-------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|
|  | Date                      | Time              | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| Sample ID  | Specify Here              |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| 1  | PW-128+50-ST1-100617      | 10/6/17           | 10:00                           | WATER                | 3               | N                 |  |   |   | X   |   |   |  | 39 MS/cm |
| 2  | PW-128+50-ST1-100617 (26) |                   | 10:00                           |                      | 5               | Y                 |  |   |   |   | X   | X   | X  | 39 MS/cm |
| 3  | PW-130+75-ST1-100617      |                   | 11:30                           |                      | 3               | N                 |  |   |   | X   |   |   |  | 39 MS/cm |
| 4  | PW-130+75-ST1-100617 (20) |                   | 11:30                           |                      | 5               | Y                 |  |   |   |   | X   | X   | X  | 39 MS/cm |
| 5  |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| 6  |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| 7  |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| 8  |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| 9  |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| 10   |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| Trip Blank (specify)   |                           |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| Relinquished By: <u>[Signature]</u>  | Date: <u>10/6/17</u>      | Time: <u>1430</u> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |
| Received By: _____   | Date: _____               | Time: _____       | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |

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18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 15, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On October 13, 2017, Brooks Applied Labs (BAL) received twelve (12) water samples in acceptable condition. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The samples submitted for arsenic speciation analyses were filtered in the field by the client.

Each client sample for arsenic speciation is collected into two (6ml Vacutainers) for anoxic storage. The two fractions for sample GW-3C5-2-101217-17.5-22.5-(20) were significantly different in color; one of the fractions was much darker compared to its corresponding partner. The client was notified. In accordance with the client's instructions, arsenic speciation analysis was performed on the clear fraction for sample GW-3C5-2-101217-17.5-22.5-(20).

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

#### Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C). All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Project Manager  
jeremy@brooksapplied.com





## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                          | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---------------------------------|------------|---------------|--------|------------|------------|
| GW-3C6-1R-101117-4.5-9.5-(20)   | 1741063-01 | Water         | Sample | 10/11/2017 | 10/13/2017 |
| GW-3C7-2R-101117-24.5-29.3-(20) | 1741063-02 | Water         | Sample | 10/11/2017 | 10/13/2017 |
| GW-2C2-2-101117-20.6-25.6-(20)  | 1741063-03 | Water         | Sample | 10/11/2017 | 10/13/2017 |
| GW-2C1-1R-101117-5.1-10.1-(20)  | 1741063-04 | Water         | Sample | 10/11/2017 | 10/13/2017 |
| GW-1C2-2-101117-13.8-23.6-(20)  | 1741063-05 | Water         | Sample | 10/11/2017 | 10/13/2017 |
| GW-1C3-1-101117-3.5-8.5-(20)    | 1741063-06 | Water         | Sample | 10/11/2017 | 10/13/2017 |
| GW-2D1-1-101217-7.5-12.5-(20)   | 1741063-07 | Water         | Sample | 10/12/2017 | 10/13/2017 |
| GW-2D3-2-101217-26.5-31.5-(20)  | 1741063-08 | Water         | Sample | 10/12/2017 | 10/13/2017 |
| GW-1D1-1-101217-9.6-14.6-(20)   | 1741063-09 | Water         | Sample | 10/12/2017 | 10/13/2017 |
| GW-3C5-2-101217-17.5-22.5-(20)  | 1741063-10 | Water         | Sample | 10/12/2017 | 10/13/2017 |
| GW-3C2-1-101217-7.5-12-(20)     | 1741063-11 | Water         | Sample | 10/12/2017 | 10/13/2017 |
| GW-3C1-1-101217-3-8-(20)        | 1741063-12 | Water         | Sample | 10/12/2017 | 10/13/2017 |

## Batch Summary

| Analyte | Lab Matrix | Method       | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|--------------|------------|------------|---------|----------|
| As(III) | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| As(V)   | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| DMAs    | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| MMAs    | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |





## Sample Results

| Sample                                 | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|--|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-3C6-1R-101117-4.5-9.5-(20)</b>   |         |               |       |         |           |       |      |      |         |          |
| 1741063-01                             | As(III) | Water         | D     | 5.31    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-01                             | As(V)   | Water         | D     | 9.73    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-01                             | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-01                             | MMAs    | Water         | D     | 0.417   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-3C7-2R-101117-24.5-29.3-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1741063-02                             | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-02                             | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-02                             | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-02                             | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-2C2-2-101117-20.6-25.6-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1741063-03                             | As(III) | Water         | D     | 1.63    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-03                             | As(V)   | Water         | D     | 6.10    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-03                             | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-03                             | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-2C1-1R-101117-5.1-10.1-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1741063-04                             | As(III) | Water         | D     | 81.7    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-04                             | As(V)   | Water         | D     | 223     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-04                             | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-04                             | MMAs    | Water         | D     | 0.487   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-1C2-2-101117-13.8-23.6-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1741063-05                             | As(III) | Water         | D     | 1.24    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-05                             | As(V)   | Water         | D     | 2.13    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-05                             | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-05                             | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-1C3-1-101117-3.5-8.5-(20)</b>    |         |               |       |         |           |       |      |      |         |          |
| 1741063-06                             | As(III) | Water         | D     | 584     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-06                             | As(V)   | Water         | D     | 145     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-06                             | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-06                             | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |



## Sample Results

| Sample                                | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|---------------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-2D1-1-101217-7.5-12.5-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1741063-07                            | As(III) | Water         | D     | 1.97    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-07                            | As(V)   | Water         | D     | 1.88    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-07                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-07                            | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-2D3-2-101217-26.5-31.5-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1741063-08                            | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-08                            | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-08                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-08                            | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-1D1-1-101217-9.6-14.6-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1741063-09                            | As(III) | Water         | D     | 6.36    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-09                            | As(V)   | Water         | D     | 10.3    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-09                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-09                            | MMAAs   | Water         | D     | 0.232   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-3C5-2-101217-17.5-22.5-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1741063-10                            | As(III) | Water         | D     | 13.3    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-10                            | As(V)   | Water         | D     | 5.72    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-10                            | DMAs    | Water         | D     | 0.357   | J         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-10                            | MMAAs   | Water         | D     | 0.458   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-3C2-1-101217-7.5-12-(20)</b>    |         |               |       |         |           |       |      |      |         |          |
| 1741063-11                            | As(III) | Water         | D     | 4.73    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-11                            | As(V)   | Water         | D     | 7.21    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-11                            | DMAs    | Water         | D     | 0.300   | J         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-11                            | MMAAs   | Water         | D     | 0.379   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-3C1-1-101217-3-8-(20)</b>       |         |               |       |         |           |       |      |      |         |          |
| 1741063-12                            | As(III) | Water         | D     | 50.7    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-12                            | As(V)   | Water         | D     | 91.1    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1741063-12                            | DMAs    | Water         | D     | 2.12    |           | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1741063-12                            | MMAAs   | Water         | D     | 14.3    |           | 0.200 | 1.15 | µg/L | B172708 | 1701318  |



## Accuracy & Precision Summary

Batch: B172708  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.034  | µg/L  | 100% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.950  | µg/L  | 99% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.916  | µg/L  | 91% 75-125   |              |
| B172708-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMAAs                                       |        | 4.634 | 4.697  | µg/L  | 101% 75-125  |              |
| B172708-DUP1 | <b>Duplicate, (1741002-14)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 0.275  |       | 0.258  | µg/L  |              | 7% 25        |
|              | As(V)                                       | 1.644  |       | 1.594  | µg/L  |              | 3% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172708-MS1  | <b>Matrix Spike, (1741002-14)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 0.275  | 50.00 | 52.22  | µg/L  | 104% 75-125  |              |
|              | As(V)                                       | 1.644  | 50.00 | 51.18  | µg/L  | 99% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 54.15  | µg/L  | 106% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 52.03  | µg/L  | 104% 75-125  |              |
| B172708-MSD1 | <b>Matrix Spike Duplicate, (1741002-14)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 0.275  | 50.00 | 53.42  | µg/L  | 106% 75-125  | 2% 25        |
|              | As(V)                                       | 1.644  | 50.00 | 52.26  | µg/L  | 101% 75-125  | 2% 25        |
|              | DMAs  | ND     | 51.00 | 55.26  | µg/L  | 108% 75-125  | 2% 25        |
|              | MMAAs                                       | ND     | 50.00 | 52.47  | µg/L  | 105% 75-125  | 0.9% 25      |
| B172708-DUP2 | <b>Duplicate, (1741063-07)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 1.975  |       | 1.965  | µg/L  |              | 0.5% 25      |
|              | As(V)                                       | 1.885  |       | 1.723  | µg/L  |              | 9% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172708-MS2  | <b>Matrix Spike, (1741063-07)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 1.975  | 50.00 | 54.76  | µg/L  | 106% 75-125  |              |
|              | As(V)                                       | 1.885  | 50.00 | 54.54  | µg/L  | 105% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 53.34  | µg/L  | 105% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 52.61  | µg/L  | 105% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741063  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B172708  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-MSD2 | <b>Matrix Spike Duplicate, (1741063-07)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 1.975  | 50.00 | 55.32  | µg/L  | 107% 75-125  | 1% 25        |
|              | As(V)                                       | 1.885  | 50.00 | 54.04  | µg/L  | 104% 75-125  | 0.9% 25      |
|              | DMAs  | ND     | 51.00 | 54.06  | µg/L  | 106% 75-125  | 1% 25        |
|              | MMAs  | ND     | 50.00 | 53.17  | µg/L  | 106% 75-125  | 1% 25        |



## Method Blanks & Reporting Limits

**Batch:** B172708  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B172708-BLK1    | 0.00   | µg/L  |                   |
| B172708-BLK2    | 0.00   | µg/L  |                   |
| B172708-BLK3    | 0.00   | µg/L  |                   |
| B172708-BLK4    | 0.00   | µg/L  |                   |
| <b>Average:</b> | 0.000  |       | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | 0.020  |       | <b>MRL:</b> 0.020 |

**Analyte:** As(V)

| Sample          | Result   | Units |                   |
|-----------------|----------|-------|-------------------|
| B172708-BLK1    | -0.00004 | µg/L  |                   |
| B172708-BLK2    | -0.0007  | µg/L  |                   |
| B172708-BLK3    | -0.0005  | µg/L  |                   |
| B172708-BLK4    | -0.003   | µg/L  |                   |
| <b>Average:</b> | -0.001   |       | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | 0.020    |       | <b>MRL:</b> 0.020 |

**Analyte:** DMAs

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B172708-BLK1    | 0.00   | µg/L  |                   |
| B172708-BLK2    | 0.00   | µg/L  |                   |
| B172708-BLK3    | 0.00   | µg/L  |                   |
| B172708-BLK4    | 0.00   | µg/L  |                   |
| <b>Average:</b> | 0.000  |       | <b>MDL:</b> 0.005 |
| <b>Limit:</b>   | 0.021  |       | <b>MRL:</b> 0.021 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741063  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172708-BLK1    | 0.00          | µg/L         |                   |
| B172708-BLK2    | 0.00          | µg/L         |                   |
| B172708-BLK3    | 0.00          | µg/L         |                   |
| B172708-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL:</b> 0.023 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741063  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|  |                  |                             |            |                              |              |           |                    |
|--|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1741063-01                    |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/11/2017 |              |           |                    |
| <b>Sample:</b> GW-3C6-1R-101117-4.5-9.5-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/13/2017  |              |           |                    |
| <b>Des</b>                                   | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |
| B  | EXTRA_VOL        | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |

|  |                  |                             |            |                              |              |           |                    |
|--|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1741063-02                      |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/11/2017 |              |           |                    |
| <b>Sample:</b> GW-3C7-2R-101117-24.5-29.3-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/13/2017  |              |           |                    |
| <b>Des</b>                                     | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |
| B  | EXTRA_VOL        | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |

|   |                  |                             |            |                              |              |           |                    |
|---|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1741063-03                     |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/11/2017 |              |           |                    |
| <b>Sample:</b> GW-2C2-2-101117-20.6-25.6-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/13/2017  |              |           |                    |
| <b>Des</b>                                    | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |
| B   | EXTRA_VOL        | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |

|   |                  |                             |            |                              |              |           |                    |
|---|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1741063-04                     |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/11/2017 |              |           |                    |
| <b>Sample:</b> GW-2C1-1R-101117-5.1-10.1-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/13/2017  |              |           |                    |
| <b>Des</b>                                    | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |
| B   | EXTRA_VOL        | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |

|   |                  |                             |            |                              |              |           |                    |
|---|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1741063-05                     |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/11/2017 |              |           |                    |
| <b>Sample:</b> GW-1C2-2-101117-13.8-23.6-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/13/2017  |              |           |                    |
| <b>Des</b>                                    | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |
| B   | EXTRA_VOL        | 6 mL                        | 16-0247    | EDTA (PP)                    | n/a          |           | Cooler             |

Project ID: PTC-OA1701  
PM: Jeremy Maute



BAL Report 1741063  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741063-06                   |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/11/2017 |    |             |
|---|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-1C3-1-101117-3.5-8.5-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/13/2017  |    |             |
| Des   | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A   | Vacutainer | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B   | EXTRA_VOL  | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1741063-07                    |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/12/2017 |    |             |
|--|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-2D1-1-101217-7.5-12.5-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/13/2017  |    |             |
| Des  | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A  | Vacutainer | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B  | EXTRA_VOL  | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1741063-08                     |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/12/2017 |    |             |
|---|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-2D3-2-101217-26.5-31.5-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/13/2017  |    |             |
| Des   | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A   | Vacutainer | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B   | EXTRA_VOL  | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1741063-09                    |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/12/2017 |    |             |
|--|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-1D1-1-101217-9.6-14.6-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/13/2017  |    |             |
| Des  | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A  | Vacutainer | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B  | EXTRA_VOL  | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1741063-10                     |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/12/2017 |    |             |
|---|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-3C5-2-101217-17.5-22.5-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/13/2017  |    |             |
| Des   | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A   | Vacutainer | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B   | EXTRA_VOL  | 6 mL | 16-0247                     | EDTA (PP)    | n/a                          |    | Cooler      |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1741063  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1741063-11                  |                  |             | <b>Report Matrix:</b> Water |                     | <b>Collected:</b> 10/12/2017 |           |                    |
|--|------------------|-------------|-----------------------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-3C2-1-101217-7.5-12-(20) |                  |             | <b>Sample Type:</b> Sample  |                     | <b>Received:</b> 10/13/2017  |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6 mL        | 16-0247                     | EDTA (PP)           | n/a                          |           | Cooler             |
| B  | EXTRA_VOL        | 6 mL        | 16-0247                     | EDTA (PP)           | n/a                          |           | Cooler             |

| <b>Lab ID:</b> 1741063-12               |                  |             | <b>Report Matrix:</b> Water |                     | <b>Collected:</b> 10/12/2017 |           |                    |
|---|------------------|-------------|-----------------------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-3C1-1-101217-3-8-(20) |                  |             | <b>Sample Type:</b> Sample  |                     | <b>Received:</b> 10/13/2017  |           |                    |
| <b>Des</b>                              | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                       | Vacutainer       | 6 mL        | 16-0247                     | EDTA (PP)           | n/a                          |           | Cooler             |
| B                                       | EXTRA_VOL        | 6 mL        | 16-0247                     | EDTA (PP)           | n/a                          |           | Cooler             |

## Shipping Containers

### Cooler

**Received:** October 13, 2017 11:25  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 3.9 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#14

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

BAL Report 1741063

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: SBC For BAL use only Date: 10/13/17  
Work Order ID: 1741063 Time: 11:25  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

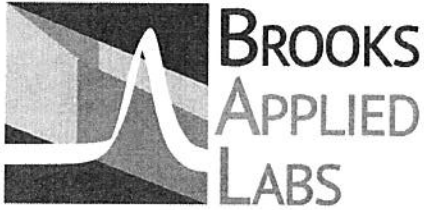
Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? **Yes**  
BAL PM: **Jeremy Maute**

| Requested TAT<br>(business days)   | Collection                              |                    | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |
|--|---|--------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|
|  | Date                                    | Time               | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| Sample ID  | Specify Here                            |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| 1  | GW-366-1R-10117-4.5-9.5 (20)            | 10/11/17           | 0945                            | Water                | 2               | Y                 | N  |   |   |   |   |   | X  |          |
| 2  | GW-367-2R-10117-24.5-29.5 (20)          |                    | 1030                            |                      | 2               |                   |  |   |   |   |   |   |  |          |
| 3  | GW-262-2-10117-20.6-25.6 (20)           |                    | 1330                            |                      |                 |                   |  |   |   |   |   |   |  |          |
| 4  | GW-261-1R-10117-5.1-10.1 (20)           |                    | 1345                            |                      |                 |                   |  |   |   |   |   |   |  |          |
| 5  | GW-162-2-10117-13.8-23.6 (20)           |                    | 1500                            |                      |                 |                   |  |   |   |   |   |   |  |          |
| 6  | GW-163-1-10117-3.5-8.5 (20)             |                    | 1530                            |                      |                 |                   |  |   |   |   |   |   |  |          |
| 7  | GW-201-1-101217-7.5-12.5 (20)           | 10/12/17           | 0900                            |                      |                 |                   |  |   |   |   |   |   |  |          |
| 8  | GW-203-2-101217-26.5-31.5 (20)          |                    | 0845                            |                      |                 |                   |  |   |   |   |   |   |  |          |
| 9  | GW-101-1-101217-9.6-14.6 (20)           |                    | 1045                            |                      |                 |                   |  |   |   |   |   |   |  |          |
| 10   | GW-365-2-101217-17.5-22.5 (20)          |                    | 1130                            |                      |                 |                   |  |   |   |   |   |   |  |          |
| Trip Blank (specify)   |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |
| Relinquished By: <u>[Signature]</u>  | Date: <u>10-13-17</u>                   | Time: <u>11:25</u> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |
| Received By: <u>SBC</u>  | Date: <u>10/13/17</u>                   | Time: <u>11:25</u> | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |

**Print**



# Chain-of-Custody Form

BAL Report 1741063

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: SRC For BAL use only Date: 10/13/17

Work Order ID: 1741063 Time: 11:25

Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection            |                             | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|-----------------------|-----------------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                  | Time                        | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-9 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID             |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          | Specify Here                         |
|   | 1                     | GW-3C2-1-101217-2.5-12-(20) | 10/12/17           | 1115                 | water           | 2                         | Y  | Z   |   |   |   | X   |  |          |                                      |
|   | 2                     | GW-3C1-1-101217-3-8-(20)    | ↓                  | 1315                 | ↓               | ↓                         | ↓  | ↓   |   |   |   | ↓   |  |          |                                      |
|   | 3                     |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | 4                     |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | 5                     |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | 6                     |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | 7                     |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | 8                     |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | 9                     |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | 10                    |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | Trip Blank (specify)  |                             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>[Signature]</u>   | Date: <u>10-13-17</u> | Time: <u>11:25</u>          | Relinquished By:   | Date:                | Time:           | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |
| Received By: <u>SRC</u>   | Date: <u>10/13/17</u> | Time: <u>11:25</u>          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |

Print



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 15, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On October 16, 2017, Brooks Applied Labs (BAL) received eleven (11) water samples in acceptable condition. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The samples submitted for arsenic speciation analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

#### Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C). All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Project Manager  
jeremy@brooksapplied.com





## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                         | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|--------------------------------|------------|---------------|--------|------------|------------|
| GW-3D1-1-101217-4.5-12.5-(20)  | 1742001-01 | Water         | Sample | 10/12/2017 | 10/16/2017 |
| GW-4D2-1-101217-4.3-9.3-(20)   | 1742001-02 | Water         | Sample | 10/12/2017 | 10/16/2017 |
| GW-3E1-1-101217-5-10-(20)      | 1742001-03 | Water         | Sample | 10/12/2017 | 10/16/2017 |
| GW-2B1-1-101317-3-10-(20)      | 1742001-04 | Water         | Sample | 10/13/2017 | 10/16/2017 |
| GW-2B2-2-101317-30.8-35.8-(20) | 1742001-05 | Water         | Sample | 10/13/2017 | 10/16/2017 |
| GW-2A1-1-101317-9-14-(20)      | 1742001-06 | Water         | Sample | 10/13/2017 | 10/16/2017 |
| GW-4B3-1-101317-4.5-10.5-(20)  | 1742001-07 | Water         | Sample | 10/13/2017 | 10/16/2017 |
| GW-4B2-2-101317-22.5-27.5-(20) | 1742001-08 | Water         | Sample | 10/13/2017 | 10/16/2017 |
| GW-4B3-2-101317-17.5-27.5-(20) | 1742001-09 | Water         | Sample | 10/13/2017 | 10/16/2017 |
| GW-3E1-2-101317-17.5-22.5-(20) | 1742001-10 | Water         | Sample | 10/13/2017 | 10/16/2017 |
| GW-4F1-1-101317-4.5-9.5-(20)   | 1742001-11 | Water         | Sample | 10/13/2017 | 10/16/2017 |

## Batch Summary

| Analyte | Lab Matrix | Method       | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|--------------|------------|------------|---------|----------|
| As(III) | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| As(V)   | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| DMAs    | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| MMAs    | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |



## Sample Results

| Sample                                | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|---------------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-3D1-1-101217-4.5-12.5-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742001-01                            | As(III) | Water         | D     | 32.7    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-01                            | As(V)   | Water         | D     | 8.48    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-01                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-01                            | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-4D2-1-101217-4.3-9.3-(20)</b>   |         |               |       |         |           |       |      |      |         |          |
| 1742001-02                            | As(III) | Water         | D     | 63.3    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-02                            | As(V)   | Water         | D     | 116     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-02                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-02                            | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-3E1-1-101217-5-10-(20)</b>      |         |               |       |         |           |       |      |      |         |          |
| 1742001-03                            | As(III) | Water         | D     | 142     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-03                            | As(V)   | Water         | D     | 28.7    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-03                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-03                            | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-2B1-1-101317-3-10-(20)</b>      |         |               |       |         |           |       |      |      |         |          |
| 1742001-04                            | As(III) | Water         | D     | 55.6    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-04                            | As(V)   | Water         | D     | 96.8    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-04                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-04                            | MMAs    | Water         | D     | 0.289   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-2B2-2-101317-30.8-35.8-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742001-05                            | As(III) | Water         | D     | 0.654   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-05                            | As(V)   | Water         | D     | 0.358   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-05                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-05                            | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-2A1-1-101317-9-14-(20)</b>      |         |               |       |         |           |       |      |      |         |          |
| 1742001-06                            | As(III) | Water         | D     | 72.8    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-06                            | As(V)   | Water         | D     | 12.1    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-06                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-06                            | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |





## Sample Results

| Sample                                | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|---------------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-4B3-1-101317-4.5-10.5-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742001-07                            | As(III) | Water         | D     | 191     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-07                            | As(V)   | Water         | D     | 46.5    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-07                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-07                            | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-4B2-2-101317-22.5-27.5-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742001-08                            | As(III) | Water         | D     | 0.470   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-08                            | As(V)   | Water         | D     | 0.202   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-08                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-08                            | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-4B3-2-101317-17.5-27.5-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742001-09                            | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-09                            | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-09                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-09                            | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-3E1-2-101317-17.5-22.5-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742001-10                            | As(III) | Water         | D     | 0.261   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-10                            | As(V)   | Water         | D     | 0.344   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-10                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-10                            | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-4F1-1-101317-4.5-9.5-(20)</b>   |         |               |       |         |           |       |      |      |         |          |
| 1742001-11                            | As(III) | Water         | D     | 20.8    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-11                            | As(V)   | Water         | D     | 13.1    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742001-11                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742001-11                            | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |



## Accuracy & Precision Summary

Batch: B172708  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.034  | µg/L  | 100% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.950  | µg/L  | 99% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.916  | µg/L  | 91% 75-125   |              |
| B172708-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMAAs                                       |        | 4.634 | 4.697  | µg/L  | 101% 75-125  |              |
| B172708-DUP2 | <b>Duplicate, (1741063-07)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 1.975  |       | 1.965  | µg/L  |              | 0.5% 25      |
|              | As(V)                                       | 1.885  |       | 1.723  | µg/L  |              | 9% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172708-MS2  | <b>Matrix Spike, (1741063-07)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 1.975  | 50.00 | 54.76  | µg/L  | 106% 75-125  |              |
|              | As(V)                                       | 1.885  | 50.00 | 54.54  | µg/L  | 105% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 53.34  | µg/L  | 105% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 52.61  | µg/L  | 105% 75-125  |              |
| B172708-MSD2 | <b>Matrix Spike Duplicate, (1741063-07)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 1.975  | 50.00 | 55.32  | µg/L  | 107% 75-125  | 1% 25        |
|              | As(V)                                       | 1.885  | 50.00 | 54.04  | µg/L  | 104% 75-125  | 0.9% 25      |
|              | DMAs  | ND     | 51.00 | 54.06  | µg/L  | 106% 75-125  | 1% 25        |
|              | MMAAs                                       | ND     | 50.00 | 53.17  | µg/L  | 106% 75-125  | 1% 25        |
| B172708-DUP3 | <b>Duplicate, (1742001-11)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 20.80  |       | 20.47  | µg/L  |              | 2% 25        |
|              | As(V)                                       | 13.07  |       | 13.38  | µg/L  |              | 2% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172708-MS3  | <b>Matrix Spike, (1742001-11)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 20.80  | 50.00 | 72.79  | µg/L  | 104% 75-125  |              |
|              | As(V)                                       | 13.07  | 50.00 | 66.26  | µg/L  | 106% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 54.52  | µg/L  | 107% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 53.73  | µg/L  | 107% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742001  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B172708  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-MSD3 | <b>Matrix Spike Duplicate, (1742001-11)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 20.80  | 50.00 | 75.18  | µg/L  | 109% 75-125  | 3% 25        |
|              | As(V)                                       | 13.07  | 50.00 | 64.35  | µg/L  | 103% 75-125  | 3% 25        |
|              | DMAs  | ND     | 51.00 | 53.08  | µg/L  | 104% 75-125  | 3% 25        |
|              | MMA   | ND     | 50.00 | 53.22  | µg/L  | 106% 75-125  | 1% 25        |



## Method Blanks & Reporting Limits

**Batch:** B172708  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172708-BLK1    | 0.00         | µg/L  |                   |
| B172708-BLK2    | 0.00         | µg/L  |                   |
| B172708-BLK3    | 0.00         | µg/L  |                   |
| B172708-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B172708-BLK1    | -0.00004      | µg/L  |                   |
| B172708-BLK2    | -0.0007       | µg/L  |                   |
| B172708-BLK3    | -0.0005       | µg/L  |                   |
| B172708-BLK4    | -0.003        | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b>  |       | <b>MRL: 0.020</b> |

**Analyte:** DMAs

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172708-BLK1    | 0.00         | µg/L  |                   |
| B172708-BLK2    | 0.00         | µg/L  |                   |
| B172708-BLK3    | 0.00         | µg/L  |                   |
| B172708-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742001  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172708-BLK1    | 0.00          | µg/L         |                   |
| B172708-BLK2    | 0.00          | µg/L         |                   |
| B172708-BLK3    | 0.00          | µg/L         |                   |
| B172708-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL: 0.023</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742001  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742001-01                    |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/12/2017 |              |           |                    |
|--|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-3D1-1-101217-4.5-12.5-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/16/2017  |              |           |                    |
| <b>Des</b>                                   | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B  | EXTRA_VOL        | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1742001-02                   |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/12/2017 |              |           |                    |
|---|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-4D2-1-101217-4.3-9.3-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/16/2017  |              |           |                    |
| <b>Des</b>                                  | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B   | EXTRA_VOL        | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1742001-03                |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/12/2017 |              |           |                    |
|--|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-3E1-1-101217-5-10-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/16/2017  |              |           |                    |
| <b>Des</b>                               | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B  | EXTRA_VOL        | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1742001-04                |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/13/2017 |              |           |                    |
|--|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-2B1-1-101317-3-10-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/16/2017  |              |           |                    |
| <b>Des</b>                               | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B  | EXTRA_VOL        | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1742001-05                     |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/13/2017 |              |           |                    |
|---|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-2B2-2-101317-30.8-35.8-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/16/2017  |              |           |                    |
| <b>Des</b>                                    | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B   | EXTRA_VOL        | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742001  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742001-06                |                  |             | <b>Report Matrix:</b> Water |                     | <b>Collected:</b> 10/13/2017 |           |                    |
|--|------------------|-------------|-----------------------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-2A1-1-101317-9-14-(20) |                  |             | <b>Sample Type:</b> Sample  |                     | <b>Received:</b> 10/16/2017  |           |                    |
| <b>Des</b>                               | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |
| B  | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |

| <b>Lab ID:</b> 1742001-07                    |                  |             | <b>Report Matrix:</b> Water |                     | <b>Collected:</b> 10/13/2017 |           |                    |
|--|------------------|-------------|-----------------------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-4B3-1-101317-4.5-10.5-(20) |                  |             | <b>Sample Type:</b> Sample  |                     | <b>Received:</b> 10/16/2017  |           |                    |
| <b>Des</b>                                   | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |
| B  | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |

| <b>Lab ID:</b> 1742001-08                     |                  |             | <b>Report Matrix:</b> Water |                     | <b>Collected:</b> 10/13/2017 |           |                    |
|---|------------------|-------------|-----------------------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-4B2-2-101317-22.5-27.5-(20) |                  |             | <b>Sample Type:</b> Sample  |                     | <b>Received:</b> 10/16/2017  |           |                    |
| <b>Des</b>                                    | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |
| B   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |

| <b>Lab ID:</b> 1742001-09                     |                  |             | <b>Report Matrix:</b> Water |                     | <b>Collected:</b> 10/13/2017 |           |                    |
|---|------------------|-------------|-----------------------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-4B3-2-101317-17.5-27.5-(20) |                  |             | <b>Sample Type:</b> Sample  |                     | <b>Received:</b> 10/16/2017  |           |                    |
| <b>Des</b>                                    | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |
| B   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |

| <b>Lab ID:</b> 1742001-10                     |                  |             | <b>Report Matrix:</b> Water |                     | <b>Collected:</b> 10/13/2017 |           |                    |
|---|------------------|-------------|-----------------------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-3E1-2-101317-17.5-22.5-(20) |                  |             | <b>Sample Type:</b> Sample  |                     | <b>Received:</b> 10/16/2017  |           |                    |
| <b>Des</b>                                    | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |
| B   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a                          |           | Cooler             |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742001  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|   |                  |             |                             |                     |              |                              |                    |
|---|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1742001-11                   |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/13/2017 |                    |
| <b>Sample:</b> GW-4F1-1-101317-4.5-9.5-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/16/2017  |                    |
| <b>Des</b>                                  | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |
| B   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |

## Shipping Containers

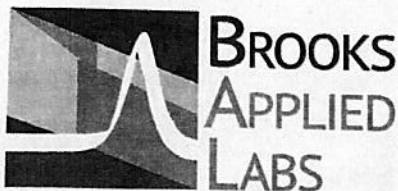
### Cooler

**Received:** October 16, 2017 13:23  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 3.0 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes





# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Received by: SEC For BAL use only Date: 10/16/17  
Work Order ID: 1742001 Time: 13:23  
Project ID: \_\_\_\_\_

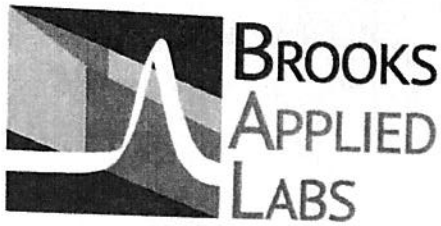
Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503  
Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection                     |                       | Client Sample Info |                           |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|--------------------------------|-----------------------|--------------------|---------------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                           | Time                  | Matrix Type        | Number of Containers      | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-6 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID                      |                       |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 1  | GW-3D1-1-101217-4.5-12.5-(20)  | 10/12/17 1400         | water              | 2                         | Y               | Z                 |  |   |   |   |   |   | X  |          |                                      |
| 2  | GW-4D2-1-101217-4.3-9.3-(20)   | ↓ 1530                | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| 3  | GW-3E1-1-101217-5-10-(20)      | ↓ 1600                | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| 4  | GW-2B1-1-101317-3-10-(20)      | 10/13/17 0845         | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| 5  | GW-2B2-2-101317-30.9-35.8-(20) | ↓ 0900                | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| 6  | GW-2A1-1-101317-9-14-(20)      | ↓ 1015                | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| 7  | GW-4B3-1-101317-4.5-10.5-(20)  | ↓ 1030                | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| 8  | GW-4B2-2-101317-22.5-27.5-(20) | ↓ 1145                | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| 9  | GW-4B3-2-101317-17.5-22.5-(20) | ↓ 1230                | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| 10   | GW-3E1-2-101317-17.5-22.5-(20) | ↓ 1330                | ↓                  | ↓                         | ↓               | ↓                 |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |                                |                       |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>[Signature]</u>  |                                | Date: <u>10/16/17</u> | Time: <u>1323</u>  | Relinquished By:          |                 |                   |  | Date:   | Time:   |   |   |   |  |          |                                      |
| Received By: <u>SEC</u>  |                                | Date: <u>10/16/17</u> | Time: <u>13:23</u> | Total Number of Packages: |                 |                   |  |   |   |   |   |   |  |          |                                      |

samples@brooksupplied.com | brooksupplied.com

Page 1 of 2 List Hazardous Contaminants: \_\_\_\_\_

Print



# Chain-of-Custody Form

BAL Report 1742001

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF)  
 Contact: Troy Bussey (PIONEER)  
 Client Project ID: Arkema FS DG Inv

PO Number: 79224  
 Phone: 360-570-1700  
 Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: SFL For BAL use only Date: \_\_\_\_\_

Work Order ID: 1742001 Time: \_\_\_\_\_

Project ID: \_\_\_\_\_

Mail Invoice to:  
 Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837

Mail Report to:  
 Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection           |                            | Client Sample Info |                                 |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |              |
|--|----------------------|----------------------------|--------------------|---------------------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|--------------|
|  | Date                 | Time                       | Matrix Type        | Number of Containers            | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-3 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID            |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      | Specify Here |
|  | 1                    | GW-4F1-1-DB17-4.5-1.5-(20) | 10/13/17           | 1345                            | Water           | 2                 | Y  | N   |   |   |   |   | X  |          |                                      |              |
|  | 2                    |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | 3                    |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | 4                    |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | 5                    |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | 6                    |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | 7                    |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | 8                    |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | 9                    |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | 10                   |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | Trip Blank (specify) |                            |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| Relinquished By: <u>[Signature]</u>  |                      | Date: <u>10/16/17</u>      | Time: <u>1323</u>  | Relinquished By: _____          |                 |                   |  | Date: _____   | Time: _____   |   |   |   |  |          |                                      |              |
| Received By: <u>SFL</u>  |                      | Date: <u>10/16/17</u>      | Time: <u>13:23</u> | Total Number of Packages: _____ |                 |                   |  |   |   |   |   |   |  |          |                                      |              |

**Print**





18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

December 19, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On October 17, 2017, Brooks Applied Labs (BAL) received twenty-three (23) water samples in a sealed container with a temperature of 5.0°C. The samples were logged-in for the total recoverable and dissolved metals (aluminum [Al], arsenic [As], calcium [Ca], iron [Fe], potassium [K], magnesium [Mg], manganese [Mg], sodium [Na], and silicon [Si]) analyses via digestion and subsequent analysis by modified EPA Method 1638. The samples were logged in for total recoverable and dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. The samples were logged-in for the total mercury [Hg] analysis by EPA Method 1631E. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The samples submitted for arsenic speciation and dissolved analyses were filtered in the field by the client.

The trace metals fractions designated for Column Chelation (EPA Method 1640) analyses arrived in high-density polyethylene (HDPE) bottles that were not lot tested down to levels adjusted to EPA Method 1640 levels, which yield lower MDLs/MRLs compared to EPA Method 1638 analyses. These fractions were collected in HDPE bottles cleaned and lot tested for EPA Method 1638 analyses.

In accordance with the client's instructions, the sample IDs were amended for the two samples listed on the chain-of-custody (COC) form with the suffix ending in "...**Date-(01)-(20)**". In each case the end term in the sample ID was changed from "...**Date-(01)-(20)**" to "...**Date-(21)**" for reporting. This applies to samples 1742020-14 and 1742020-20.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

*Total Recoverable and Dissolved Metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, Pb, and Si) Analysis by EPA Method*

*1638, Mod.*

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Total recoverable and dissolved metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, Pb, and Si) quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

#### **Batch B172756**

Calcium results for samples 1742020-08, 1742020-12, 1742020-14, and 1742020-18 were above the high calibration standard and the passing high calibration standard (HCV recovery = 100%). The samples were re-analyzed at lower dilutions, confirming the results in Batch B172756. Because of poor internal standard recoveries in the re-analyses, calcium results are reported from this batch (B172756). No qualification of data was necessary.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### **Batch B173137**

The dissolved Mg and Na results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values for total recoverable Mg and Na have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. For Mg, the MRL is set by a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the value of the corresponding MDL. Due to an elevated MDL, it was necessary to raise the Na MRL to 2 times the value of the MDL. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### *Total Recoverable metals (Ni) Analysis by EPA Method 1640, Mod.*

Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid (HNO<sub>3</sub>) and then prepared according to EPA Method 1640. All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). The ICP-DRC-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

**Batch B173101**

The trace metals fractions designated for Column Chelation (EPA Method 1640) analyses arrived in high-density polyethylene (HDPE) bottles that were not lot tested down to levels adjusted to EPA Method 1640 levels, which yield lower MDLs/MRLs compared to EPA Method 1638 analyses. These fractions were collected in HDPE bottles cleaned and lot tested for EPA Method 1638 analyses.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

**Total and Dissolved Mercury Quantitation by EPA Method 1631E**

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

**Batch B172821**

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

**Arsenic Speciation Analysis by IC-ICP-CRC-MS**

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

**Batch B172708**

The MMAs matrix spike and matrix spike duplicate (B172708-MS4/B172708-MSD4) recoveries were below the lower control limit of 75% (each at 17%). A large unknown arsenic peak is present immediately following the identified MMAs peak, suggesting species conversion. Including both peaks, the total recovery of MS4 and MSD4 is 112% and 111%, respectively. The low recoveries for MMAs correlate with the elevated recoveries of the neighboring unknown arsenic peak, suggesting that the sample matrix induces species conversion. No species conversion was observed in the bracketing continuing calibration verification standards (CCVs), demonstrating that the applied method stabilizes these species in solution. Since the low recoveries observed for MMAs in the MS and MSD are therefore attributable to the sample matrix, no corrective actions were required. The reported results are deemed representative of the supplied samples and indicate that the spiked sample matrix favors the unknown arsenic species.

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,



Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksapplied.com



Collette Machado  
Project Coordinator  
Brooks Applied Labs  
Collette@brooksapplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                          | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---------------------------------|------------|---------------|--------|------------|------------|
| GW-3A3-1R-101617-8.2-13.2       | 1742020-01 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-3A3-1R-101617-8.2-13.2-(20)  | 1742020-02 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-3A2-2R-101617-22.3-27.3      | 1742020-03 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-3A2-2R-101617-22.3-27.3-(20) | 1742020-04 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-3A7-1R-101617                | 1742020-05 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-3A7-1R-101617-(20)           | 1742020-06 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-3A6-2R-101617                | 1742020-07 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-3A6-2R-101617-(20)           | 1742020-08 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-4B4-1-101617                 | 1742020-09 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-4B4-1-101617-(20)            | 1742020-10 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-4B4-2-101617                 | 1742020-11 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-4B4-2-101617-(20)            | 1742020-12 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-4B4-2-101617-(01)            | 1742020-13 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-4B4-2-101617-(21)            | 1742020-14 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-5B1-1R-101617                | 1742020-15 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-5B1-1R-101617-(20)           | 1742020-16 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-5B1-2R-101617                | 1742020-17 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-5B1-2R-101617-(20)           | 1742020-18 | Water         | Sample | 10/16/2017 | 10/17/2017 |
| GW-5C16-1R-101717-(20)          | 1742020-19 | Water         | Sample | 10/17/2017 | 10/17/2017 |
| GW-5C16-1R-101717-(21)          | 1742020-20 | Water         | Sample | 10/17/2017 | 10/17/2017 |
| GW-5C16-2R-101717-(20)          | 1742020-21 | Water         | Sample | 10/17/2017 | 10/17/2017 |
| GW-5C12-1-101717-(20)           | 1742020-22 | Water         | Sample | 10/17/2017 | 10/17/2017 |
| GW-5C10-2-101717-(20)           | 1742020-23 | Water         | Sample | 10/17/2017 | 10/17/2017 |





## Batch Summary

| Analyte | Lab Matrix | Method          | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|-----------------|------------|------------|---------|----------|
| Al      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| As      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| As(III) | Water      | SOP BAL-4100    | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| As(V)   | Water      | SOP BAL-4100    | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| Ca      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Cu      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| DMAs    | Water      | SOP BAL-4100    | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| Fe      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Hg      | Water      | EPA 1631 E      | 10/19/2017 | 10/21/2017 | B172821 | 1701300  |
| K       | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Mg      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/18/2017 | B173137 | 1701442  |
| MMAAs   | Water      | SOP BAL-4100    | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| Mn      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Na      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/18/2017 | B173137 | 1701442  |
| Na      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/23/2017 | B173137 | 1701472  |
| Ni      | Water      | EPA 1640 Column | 11/03/2017 | 11/16/2017 | B173101 | 1701419  |
| Pb      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |
| Si      | Water      | EPA 1638 Mod    | 10/30/2017 | 11/07/2017 | B172756 | 1701392  |



## Sample Results

| Sample                                | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|---------------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-3A3-1R-101617-8.2-13.2</b>      |         |               |       |         |           |       |       |      |         |          |
| 1742020-01                            | As      | Water         | TR    | 54.0    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-01                            | Cu      | Water         | TR    | 1.58    | J         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-01                            | Hg      | Water         | TR    | 5.49    |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-01                            | Ni      | Water         | TR    | 5.69    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-01                            | Pb      | Water         | TR    | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| <b>GW-3A3-1R-101617-8.2-13.2-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1742020-02                            | Al      | Water         | D     | 40.1    | J         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-02                            | As      | Water         | D     | 57.8    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-02                            | As(III) | Water         | D     | 29.3    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-02                            | As(V)   | Water         | D     | 29.4    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-02                            | Ca      | Water         | D     | 61600   |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-02                            | Cu      | Water         | D     | 1.25    | J         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-02                            | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-02                            | Fe      | Water         | D     | 10600   |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-02                            | Hg      | Water         | D     | 4.07    |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-02                            | K       | Water         | D     | 7680    |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-02                            | Mg      | Water         | D     | 70800   |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1742020-02                            | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-02                            | Mn      | Water         | D     | 249     |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-02                            | Na      | Water         | D     | 800000  |           | 133   | 265   | µg/L | B173137 | 1701442  |
| 1742020-02                            | Ni      | Water         | D     | 5.55    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-02                            | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-02                            | Si      | Water         | D     | 24000   |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-3A2-2R-101617-22.3-27.3</b>     |         |               |       |         |           |       |       |      |         |          |
| 1742020-03                            | As      | Water         | TR    | 4.54    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-03                            | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-03                            | Hg      | Water         | TR    | 0.63    |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-03                            | Ni      | Water         | TR    | 0.658   |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-03                            | Pb      | Water         | TR    | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                                 | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--|---------|---------------|-------|----------|-----------|-------|-------|------|---------|----------|
| <b>GW-3A2-2R-101617-22.3-27.3-(20)</b> |         |               |       |          |           |       |       |      |         |          |
| 1742020-04                             | Al      | Water         | D     | ≤ 20.4   | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-04                             | As      | Water         | D     | 3.38     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-04                             | As(III) | Water         | D     | 1.01     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-04                             | As(V)   | Water         | D     | 0.615    | J         | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-04                             | Ca      | Water         | D     | 362000   |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-04                             | Cu      | Water         | D     | ≤ 0.898  | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-04                             | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-04                             | Fe      | Water         | D     | 7920     |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-04                             | Hg      | Water         | D     | 0.49     |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-04                             | K       | Water         | D     | 355000   |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-04                             | Mg      | Water         | D     | 587000   |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1742020-04                             | MMAAs   | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-04                             | Mn      | Water         | D     | 1630     |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-04                             | Na      | Water         | D     | 20200000 |           | 1660  | 3320  | µg/L | B173137 | 1701442  |
| 1742020-04                             | Ni      | Water         | D     | 0.613    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-04                             | Pb      | Water         | D     | ≤ 0.204  | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-04                             | Si      | Water         | D     | 19700    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-3A7-1R-101617</b>                |         |               |       |          |           |       |       |      |         |          |
| 1742020-05                             | As      | Water         | TR    | 62.4     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-05                             | Cu      | Water         | TR    | 67.9     |           | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-05                             | Hg      | Water         | TR    | 86.4     |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-05                             | Ni      | Water         | TR    | 9.06     |           | 0.707 | 3.03  | µg/L | B173101 | 1701419  |
| 1742020-05                             | Pb      | Water         | TR    | 122      |           | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-3A7-1R-101617-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1742020-06                   | Al      | Water         | D     | 1510    |           | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-06                   | As      | Water         | D     | 42.1    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-06                   | As(III) | Water         | D     | 11.1    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-06                   | As(V)   | Water         | D     | 28.7    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-06                   | Ca      | Water         | D     | 5840    |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-06                   | Cu      | Water         | D     | 20.7    |           | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-06                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-06                   | Fe      | Water         | D     | 12300   |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-06                   | Hg      | Water         | D     | 47.9    |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-06                   | K       | Water         | D     | 8260    |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-06                   | Mg      | Water         | D     | 3600    |           | 22.0  | 69.4  | µg/L | B173137 | 1701442  |
| 1742020-06                   | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-06                   | Mn      | Water         | D     | 46.7    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-06                   | Na      | Water         | D     | 329000  |           | 133   | 265   | µg/L | B173137 | 1701442  |
| 1742020-06                   | Ni      | Water         | D     | 6.22    |           | 0.707 | 3.03  | µg/L | B173101 | 1701419  |
| 1742020-06                   | Pb      | Water         | D     | 43.7    |           | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-06                   | Si      | Water         | D     | 23600   |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-3A6-2R-101617</b>      |         |               |       |         |           |       |       |      |         |          |
| 1742020-07                   | As      | Water         | TR    | 4.13    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-07                   | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-07                   | Hg      | Water         | TR    | 1.69    |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-07                   | Ni      | Water         | TR    | 3.61    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-07                   | Pb      | Water         | TR    | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|----------|-----------|-------|-------|------|---------|----------|
| <b>GW-3A6-2R-101617-(20)</b> |         |               |       |          |           |       |       |      |         |          |
| 1742020-08                   | Al      | Water         | D     | 22.7     | J         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-08                   | As      | Water         | D     | 4.24     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-08                   | As(III) | Water         | D     | 1.81     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-08                   | As(V)   | Water         | D     | 1.63     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-08                   | Ca      | Water         | D     | 462000   |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-08                   | Cu      | Water         | D     | ≤ 0.898  | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-08                   | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-08                   | Fe      | Water         | D     | 24800    |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-08                   | Hg      | Water         | D     | 1.14     |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-08                   | K       | Water         | D     | 352000   |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-08                   | Mg      | Water         | D     | 538000   |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1742020-08                   | MMAAs   | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-08                   | Mn      | Water         | D     | 3140     |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-08                   | Na      | Water         | D     | 32300000 |           | 2650  | 5310  | µg/L | B173137 | 1701442  |
| 1742020-08                   | Ni      | Water         | D     | 3.75     |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-08                   | Pb      | Water         | D     | ≤ 0.204  | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-08                   | Si      | Water         | D     | 12800    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-4B4-1-101617</b>       |         |               |       |          |           |       |       |      |         |          |
| 1742020-09                   | As      | Water         | TR    | 49.0     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-09                   | Cu      | Water         | TR    | ≤ 0.898  | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-09                   | Hg      | Water         | TR    | 0.60     |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-09                   | Ni      | Water         | TR    | 0.842    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-09                   | Pb      | Water         | TR    | ≤ 0.204  | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-4B4-1-101617-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1742020-10                  | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-10                  | As      | Water         | D     | 45.4    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-10                  | As(III) | Water         | D     | 47.2    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-10                  | As(V)   | Water         | D     | 6.19    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-10                  | Ca      | Water         | D     | 42300   |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-10                  | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-10                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-10                  | Fe      | Water         | D     | 3630    |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-10                  | Hg      | Water         | D     | 0.33    | J         | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-10                  | K       | Water         | D     | 4420    |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-10                  | Mg      | Water         | D     | 19200   |           | 22.0  | 69.4  | µg/L | B173137 | 1701442  |
| 1742020-10                  | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-10                  | Mn      | Water         | D     | 35.0    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-10                  | Na      | Water         | D     | 27700   |           | 26.5  | 53.1  | µg/L | B173137 | 1701442  |
| 1742020-10                  | Ni      | Water         | D     | 0.822   |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-10                  | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-10                  | Si      | Water         | D     | 9270    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-4B4-2-101617</b>      |         |               |       |         |           |       |       |      |         |          |
| 1742020-11                  | As      | Water         | TR    | 3.72    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-11                  | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-11                  | Hg      | Water         | TR    | 0.19    | J         | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-11                  | Ni      | Water         | TR    | 1.68    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-11                  | Pb      | Water         | TR    | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|----------|-----------|-------|-------|------|---------|----------|
| <b>GW-4B4-2-101617-(20)</b> |         |               |       |          |           |       |       |      |         |          |
| 1742020-12                  | Al      | Water         | D     | 20.5     | J         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-12                  | As      | Water         | D     | 3.71     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-12                  | As(III) | Water         | D     | 1.44     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-12                  | As(V)   | Water         | D     | 0.868    | J         | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-12                  | Ca      | Water         | D     | 414000   |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-12                  | Cu      | Water         | D     | ≤ 0.898  | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-12                  | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-12                  | Fe      | Water         | D     | 21900    |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-12                  | Hg      | Water         | D     | 0.20     | J         | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-12                  | K       | Water         | D     | 325000   |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-12                  | Mg      | Water         | D     | 685000   |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1742020-12                  | MMAAs   | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-12                  | Mn      | Water         | D     | 1890     |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-12                  | Na      | Water         | D     | 26200000 |           | 2650  | 5310  | µg/L | B173137 | 1701442  |
| 1742020-12                  | Ni      | Water         | D     | 0.599    | J         | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-12                  | Pb      | Water         | D     | ≤ 0.204  | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-12                  | Si      | Water         | D     | 16100    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-4B4-2-101617-(01)</b> |         |               |       |          |           |       |       |      |         |          |
| 1742020-13                  | As      | Water         | TR    | 3.71     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-13                  | Cu      | Water         | TR    | ≤ 0.898  | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-13                  | Hg      | Water         | TR    | 0.27     | J         | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-13                  | Ni      | Water         | TR    | 0.752    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-13                  | Pb      | Water         | TR    | ≤ 0.204  | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |





## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|----------|-----------|-------|-------|------|---------|----------|
| <b>GW-4B4-2-101617-(21)</b> |         |               |       |          |           |       |       |      |         |          |
| 1742020-14                  | Al      | Water         | D     | ≤ 20.4   | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-14                  | As      | Water         | D     | 3.85     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-14                  | As(III) | Water         | D     | 1.43     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-14                  | As(V)   | Water         | D     | 0.809    | J         | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-14                  | Ca      | Water         | D     | 426000   |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-14                  | Cu      | Water         | D     | ≤ 0.898  | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-14                  | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-14                  | Fe      | Water         | D     | 21800    |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-14                  | Hg      | Water         | D     | 0.15     | J         | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-14                  | K       | Water         | D     | 333000   |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-14                  | Mg      | Water         | D     | 606000   |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1742020-14                  | MMAAs   | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-14                  | Mn      | Water         | D     | 1880     |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-14                  | Na      | Water         | D     | 27300000 |           | 2650  | 5310  | µg/L | B173137 | 1701442  |
| 1742020-14                  | Ni      | Water         | D     | 0.677    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-14                  | Pb      | Water         | D     | ≤ 0.204  | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-14                  | Si      | Water         | D     | 16300    |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-5B1-1R-101617</b>     |         |               |       |          |           |       |       |      |         |          |
| 1742020-15                  | As      | Water         | TR    | 1040     |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-15                  | Cu      | Water         | TR    | 13.7     |           | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-15                  | Hg      | Water         | TR    | 42.7     |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-15                  | Ni      | Water         | TR    | 3.79     |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-15                  | Pb      | Water         | TR    | 5.37     |           | 0.204 | 0.612 | µg/L | B172756 | 1701392  |





## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-5B1-1R-101617-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1742020-16                   | Al      | Water         | D     | 23.5    | J         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-16                   | As      | Water         | D     | 1040    |           | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-16                   | As(III) | Water         | D     | 76.5    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-16                   | As(V)   | Water         | D     | 109     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-16                   | Ca      | Water         | D     | 1520    |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-16                   | Cu      | Water         | D     | 9.83    |           | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-16                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-16                   | Fe      | Water         | D     | 248     |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-16                   | Hg      | Water         | D     | 35.4    |           | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-16                   | K       | Water         | D     | 8030    |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-16                   | Mg      | Water         | D     | ≤ 110   | U         | 110   | 347   | µg/L | B173137 | 1701442  |
| 1742020-16                   | MMAAs   | Water         | D     | 0.877   | J         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-16                   | Mn      | Water         | D     | 7.94    |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-16                   | Na      | Water         | D     | 613000  |           | 133   | 816   | µg/L | B173137 | 1701472  |
| 1742020-16                   | Ni      | Water         | D     | 3.61    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-16                   | Pb      | Water         | D     | 3.97    |           | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-16                   | Si      | Water         | D     | 63700   |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-5B1-2R-101617</b>      |         |               |       |         |           |       |       |      |         |          |
| 1742020-17                   | As      | Water         | TR    | 0.998   | J         | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-17                   | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-17                   | Hg      | Water         | TR    | ≤ 0.10  | U         | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-17                   | Ni      | Water         | TR    | ≤ 0.141 | U         | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-17                   | Pb      | Water         | TR    | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |



## Sample Results

| Sample                        | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-5B1-2R-101617-(20)</b>  |         |               |       |         |           |       |       |      |         |          |
| 1742020-18                    | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B172756 | 1701392  |
| 1742020-18                    | As      | Water         | D     | 0.800   | J         | 0.449 | 1.63  | µg/L | B172756 | 1701392  |
| 1742020-18                    | As(III) | Water         | D     | 0.377   | J         | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-18                    | As(V)   | Water         | D     | 0.382   | J         | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-18                    | Ca      | Water         | D     | 560000  |           | 188   | 563   | µg/L | B172756 | 1701392  |
| 1742020-18                    | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B172756 | 1701392  |
| 1742020-18                    | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-18                    | Fe      | Water         | D     | 15200   |           | 11.4  | 34.7  | µg/L | B172756 | 1701392  |
| 1742020-18                    | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.41  | ng/L | B172821 | 1701300  |
| 1742020-18                    | K       | Water         | D     | 251000  |           | 98.0  | 408   | µg/L | B172756 | 1701392  |
| 1742020-18                    | Mg      | Water         | D     | 1120000 |           | 110   | 347   | µg/L | B173137 | 1701442  |
| 1742020-18                    | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| 1742020-18                    | Mn      | Water         | D     | 566     |           | 0.857 | 2.57  | µg/L | B172756 | 1701392  |
| 1742020-18                    | Na      | Water         | D     | 8840000 |           | 1330  | 8160  | µg/L | B173137 | 1701472  |
| 1742020-18                    | Ni      | Water         | D     | 0.237   | J         | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1742020-18                    | Pb      | Water         | D     | ≤ 0.204 | U         | 0.204 | 0.612 | µg/L | B172756 | 1701392  |
| 1742020-18                    | Si      | Water         | D     | 21500   |           | 30.6  | 163   | µg/L | B172756 | 1701392  |
| <b>GW-5C16-1R-101717-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1742020-19                    | As(III) | Water         | D     | 416     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-19                    | As(V)   | Water         | D     | 19.8    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-19                    | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-19                    | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| <b>GW-5C16-1R-101717-(21)</b> |         |               |       |         |           |       |       |      |         |          |
| 1742020-20                    | As(III) | Water         | D     | 398     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-20                    | As(V)   | Water         | D     | 19.7    |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-20                    | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-20                    | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |
| <b>GW-5C16-2R-101717-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1742020-21                    | As(III) | Water         | D     | 444     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-21                    | As(V)   | Water         | D     | 338     |           | 0.200 | 1.00  | µg/L | B172708 | 1701318  |
| 1742020-21                    | DMAs    | Water         | D     | 0.436   | J         | 0.250 | 1.05  | µg/L | B172708 | 1701318  |
| 1742020-21                    | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172708 | 1701318  |



## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-5C12-1-101717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742020-22                   | As(III) | Water         | D     | 1.89    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742020-22                   | As(V)   | Water         | D     | 772     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742020-22                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742020-22                   | MMAAs   | Water         | D     | 0.241   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5C10-2-101717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742020-23                   | As(III) | Water         | D     | 161     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742020-23                   | As(V)   | Water         | D     | 678     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742020-23                   | DMAs    | Water         | D     | 0.957   | J         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742020-23                   | MMAAs   | Water         | D     | 0.652   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |



## Accuracy & Precision Summary

Batch: B172708  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.034  | µg/L  | 100% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.950  | µg/L  | 99% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.916  | µg/L  | 91% 75-125   |              |
| B172708-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMA   |        | 4.634 | 4.697  | µg/L  | 101% 75-125  |              |
| B172708-DUP4 | <b>Duplicate, (1742020-14)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 1.433  |       | 1.433  | µg/L  |              | 0.02% 25     |
|              | As(V)                                       | 0.809  |       | 0.916  | µg/L  |              | 12% 25       |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMA   | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172708-MS4  | <b>Matrix Spike, (1742020-14)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 1.433  | 50.00 | 59.17  | µg/L  | 115% 75-125  |              |
|              | As(V)                                       | 0.809  | 50.00 | 55.72  | µg/L  | 110% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 59.03  | µg/L  | 116% 75-125  |              |
|              | MMA   | ND     | 50.00 | 8.385  | µg/L  | 17% 75-125   |              |
| B172708-MSD4 | <b>Matrix Spike Duplicate, (1742020-14)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 1.433  | 50.00 | 58.24  | µg/L  | 114% 75-125  | 2% 25        |
|              | As(V)                                       | 0.809  | 50.00 | 56.13  | µg/L  | 111% 75-125  | 0.7% 25      |
|              | DMAs  | ND     | 51.00 | 58.52  | µg/L  | 115% 75-125  | 0.9% 25      |
|              | MMA   | ND     | 50.00 | 8.608  | µg/L  | 17% 75-125   | 3% 25        |
| B172708-DUP5 | <b>Duplicate, (1742020-23)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 161.3  |       | 164.2  | µg/L  |              | 2% 25        |
|              | As(V)                                       | 677.8  |       | 694.8  | µg/L  |              | 2% 25        |
|              | DMAs  | 0.957  |       | 0.995  | µg/L  |              | 4% 25        |
|              | MMA   | 0.652  |       | 0.710  | µg/L  |              | 8% 25        |
| B172708-MS5  | <b>Matrix Spike, (1742020-23)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 161.3  | 50.00 | 224.5  | µg/L  | 126% 75-125  |              |
|              | As(V)                                       | 677.8  | 50.00 | 774.3  | µg/L  | NR 75-125    |              |
|              | DMAs  | 0.957  | 51.00 | 56.77  | µg/L  | 109% 75-125  |              |
|              | MMA   | 0.652  | 50.00 | 54.92  | µg/L  | 109% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B172708  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-MSD5 | <b>Matrix Spike Duplicate, (1742020-23)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 161.3  | 50.00 | 220.5  | µg/L  | 118% 75-125  | 2% 25        |
|              | As(V)                                       | 677.8  | 50.00 | 765.7  | µg/L  | NR 75-125    | N/C 25       |
|              | DMAs  | 0.957  | 51.00 | 55.74  | µg/L  | 107% 75-125  | 2% 25        |
|              | MMAs  | 0.652  | 50.00 | 54.38  | µg/L  | 107% 75-125  | 1% 25        |



## Accuracy & Precision Summary

Batch: B172756  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte   | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|--------|--------|-------|--------------|--------------|
| <b>B172756-BS1</b>  | <b>Blank Spike, (1738012)</b>                             |        |        |        |       |              |              |
|                     | Al  |        | 396.8  | 386.4  | µg/L  | 97% 75-125   |              |
|                     | As  |        | 19.84  | 19.76  | µg/L  | 100% 75-125  |              |
|                     | Ca  |        | 396.8  | 401.1  | µg/L  | 101% 75-125  |              |
|                     | Cu  |        | 19.84  | 20.43  | µg/L  | 103% 75-125  |              |
|                     | Fe  |        | 396.8  | 397.2  | µg/L  | 100% 75-125  |              |
|                     | K   |        | 396.8  | 390.1  | µg/L  | 98% 75-125   |              |
|                     | Mn  |        | 19.84  | 19.95  | µg/L  | 101% 75-125  |              |
|                     | Pb  |        | 1.984  | 2.142  | µg/L  | 108% 75-125  |              |
| <b>B172756-BS2</b>  | <b>Blank Spike, (1738012)</b>                             |        |        |        |       |              |              |
|                     | Al  |        | 396.8  | 392.2  | µg/L  | 99% 75-125   |              |
|                     | As  |        | 19.84  | 19.59  | µg/L  | 99% 75-125   |              |
|                     | Ca  |        | 396.8  | 402.8  | µg/L  | 102% 75-125  |              |
|                     | Cu  |        | 19.84  | 20.56  | µg/L  | 104% 75-125  |              |
|                     | Fe  |        | 396.8  | 398.9  | µg/L  | 101% 75-125  |              |
|                     | K   |        | 396.8  | 389.9  | µg/L  | 98% 75-125   |              |
|                     | Mn  |        | 19.84  | 20.12  | µg/L  | 101% 75-125  |              |
|                     | Pb  |        | 1.984  | 2.088  | µg/L  | 105% 75-125  |              |
| <b>B172756-BS3</b>  | <b>Blank Spike, (1744018)</b>                             |        |        |        |       |              |              |
|                     | Si  |        | 400.0  | 364.8  | µg/L  | 91% 75-125   |              |
| <b>B172756-SRM1</b> | <b>Standard Reference Material (1724009, T221 as SRM)</b> |        |        |        |       |              |              |
|                     | Al  |        | 374.0  | 374.6  | µg/L  | 100% 75-125  |              |
|                     | As  |        | 17.70  | 17.63  | µg/L  | 100% 75-125  |              |
|                     | Ca  |        | 16700  | 16860  | µg/L  | 101% 75-125  |              |
|                     | Cu  |        | 3.780  | 3.909  | µg/L  | 103% 75-125  |              |
|                     | Fe  |        | 328.0  | 323.4  | µg/L  | 99% 75-125   |              |
|                     | K   |        | 1900   | 1868   | µg/L  | 98% 75-125   |              |
|                     | Mn  |        | 33.60  | 33.24  | µg/L  | 99% 75-125   |              |
|                     | Pb  |        | 0.4900 | 0.474  | µg/L  | 97% 75-125   |              |
|                     | Si  |        | 5843   | 5898   | µg/L  | 101% 75-125  |              |



## Accuracy & Precision Summary

Batch: B172756  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|--|--------|-------|--------|-------|--------------|--------------|
| <b>B172756-SRM2</b> | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |        |       |        |       |              |              |
|                     | Al   |        | 53.00 | 51.81  | µg/L  | 98% 75-125   |              |
|                     | As   |        | 8.075 | 7.961  | µg/L  | 99% 75-125   |              |
|                     | Ca   |        | 5615  | 5382   | µg/L  | 96% N/A      |              |
|                     | Cu   |        | 85.75 | 87.42  | µg/L  | 102% 75-125  |              |
|                     | Fe   |        | 36.80 | 35.94  | µg/L  | 98% 75-125   |              |
|                     | K  |        | 579.9 | 578.2  | µg/L  | 100% 0-200   |              |
|                     | Mn   |        | 40.39 | 38.56  | µg/L  | 95% 75-125   |              |
|                     | Pb   |        | 12.10 | 12.57  | µg/L  | 104% 75-125  |              |
|                     | Si   |        | 5210  | 5054   | µg/L  | 97% N/A      |              |
| <b>B172756-DUP7</b> | <b>Duplicate, (1742020-01)</b>                                       |        |       |        |       |              |              |
|                     | Al   | 47.43  |       | 49.15  | µg/L  |              | 4% 20        |
|                     | As   | 54.03  |       | 53.38  | µg/L  |              | 1% 20        |
|                     | Ca   | 60630  |       | 58900  | µg/L  |              | 3% 20        |
|                     | Cu   | 1.579  |       | 1.531  | µg/L  |              | 3% 20        |
|                     | Fe   | 10400  |       | 10080  | µg/L  |              | 3% 20        |
|                     | K  | 7477   |       | 7365   | µg/L  |              | 2% 20        |
|                     | Mn   | 237.9  |       | 234.1  | µg/L  |              | 2% 20        |
|                     | Pb   | ND     |       | ND     | µg/L  |              | N/C 20       |
|                     | Si   | 23690  |       | 22580  | µg/L  |              | 5% 20        |
| <b>B172756-MS7</b>  | <b>Matrix Spike, (1742020-01)</b>                                    |        |       |        |       |              |              |
|                     | Al   | 47.43  | 4082  | 3989   | µg/L  | 97% 75-125   |              |
|                     | As   | 54.03  | 408.2 | 466.9  | µg/L  | 101% 75-125  |              |
|                     | Ca   | 60630  | 4082  | 65800  | µg/L  | NR 75-125    |              |
|                     | Cu   | 1.579  | 408.2 | 407.1  | µg/L  | 99% 75-125   |              |
|                     | Fe   | 10400  | 4082  | 14440  | µg/L  | 99% 75-125   |              |
|                     | K  | 7477   | 4082  | 11800  | µg/L  | 106% 75-125  |              |
|                     | Mn   | 237.9  | 408.2 | 638.9  | µg/L  | 98% 75-125   |              |
|                     | Pb   | ND     | 40.82 | 38.02  | µg/L  | 93% 75-125   |              |
|                     | Si   | 23690  | 40820 | 65030  | µg/L  | 101% 75-125  |              |



## Accuracy & Precision Summary

Batch: B172756  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B172756-MSD7</b> | <b>Matrix Spike Duplicate, (1742020-01)</b> |        |       |        |       |              |              |
|                     | Al  | 47.43  | 4082  | 4034   | µg/L  | 98% 75-125   | 1% 20        |
|                     | As  | 54.03  | 408.2 | 468.9  | µg/L  | 102% 75-125  | 0.4% 20      |
|                     | Ca  | 60630  | 4082  | 66380  | µg/L  | NR 75-125    | N/C 20       |
|                     | Cu  | 1.579  | 408.2 | 414.6  | µg/L  | 101% 75-125  | 2% 20        |
|                     | Fe  | 10400  | 4082  | 14400  | µg/L  | 98% 75-125   | 0.3% 20      |
|                     | K   | 7477   | 4082  | 11760  | µg/L  | 105% 75-125  | 0.3% 20      |
|                     | Mn  | 237.9  | 408.2 | 645.7  | µg/L  | 100% 75-125  | 1% 20        |
|                     | Pb  | ND     | 40.82 | 39.10  | µg/L  | 96% 75-125   | 3% 20        |
|                     | Si  | 23690  | 40820 | 65000  | µg/L  | 101% 75-125  | 0.05% 20     |
| <b>B172756-DUP8</b> | <b>Duplicate, (1742020-15)</b>              |        |       |        |       |              |              |
|                     | Al  | 89.69  |       | 86.99  | µg/L  |              | 3% 20        |
|                     | As  | 1036   |       | 1057   | µg/L  |              | 2% 20        |
|                     | Ca  | 1507   |       | 1535   | µg/L  |              | 2% 20        |
|                     | Cu  | 13.66  |       | 13.37  | µg/L  |              | 2% 20        |
|                     | Fe  | 398.3  |       | 410.5  | µg/L  |              | 3% 20        |
|                     | K   | 7828   |       | 7993   | µg/L  |              | 2% 20        |
|                     | Mn  | 9.829  |       | 10.02  | µg/L  |              | 2% 20        |
|                     | Pb  | 5.373  |       | 5.604  | µg/L  |              | 4% 20        |
|                     | Si  | 65500  |       | 66860  | µg/L  |              | 2% 20        |
| <b>B172756-MS8</b>  | <b>Matrix Spike, (1742020-15)</b>           |        |       |        |       |              |              |
|                     | Al  | 89.69  | 4082  | 4014   | µg/L  | 96% 75-125   |              |
|                     | As  | 1036   | 408.2 | 1436   | µg/L  | 98% 75-125   |              |
|                     | Ca  | 1507   | 4082  | 5571   | µg/L  | 100% 75-125  |              |
|                     | Cu  | 13.66  | 408.2 | 415.5  | µg/L  | 98% 75-125   |              |
|                     | Fe  | 398.3  | 4082  | 4257   | µg/L  | 95% 75-125   |              |
|                     | K   | 7828   | 4082  | 12000  | µg/L  | 102% 75-125  |              |
|                     | Mn  | 9.829  | 408.2 | 393.3  | µg/L  | 94% 75-125   |              |
|                     | Pb  | 5.373  | 40.82 | 42.58  | µg/L  | 91% 75-125   |              |
|                     | Si  | 65500  | 40820 | 105000 | µg/L  | 97% 75-125   |              |





## Accuracy & Precision Summary

**Batch:** B172756  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample       | Analyte                              | Native | Spike | Result | Units  | REC & Limits | RPD & Limits         |
|--------------|--------------------------------------|--------|-------|--------|--------|--------------|----------------------|
| B172756-MSD8 | Matrix Spike Duplicate, (1742020-15) |        |       |        |        |              |                      |
|              |                                      | Al     | 89.69 | 4082   | 3973   | µg/L         | 95% 75-125 1% 20     |
|              |                                      | As     | 1036  | 408.2  | 1436   | µg/L         | 98% 75-125 0.003% 20 |
|              |                                      | Ca     | 1507  | 4082   | 5617   | µg/L         | 101% 75-125 0.8% 20  |
|              |                                      | Cu     | 13.66 | 408.2  | 414.0  | µg/L         | 98% 75-125 0.4% 20   |
|              |                                      | Fe     | 398.3 | 4082   | 4251   | µg/L         | 94% 75-125 0.1% 20   |
|              |                                      | K      | 7828  | 4082   | 11950  | µg/L         | 101% 75-125 0.4% 20  |
|              |                                      | Mn     | 9.829 | 408.2  | 393.2  | µg/L         | 94% 75-125 0.008% 20 |
|              |                                      | Pb     | 5.373 | 40.82  | 42.37  | µg/L         | 91% 75-125 0.5% 20   |
|              |                                      | Si     | 65500 | 40820  | 104400 | µg/L         | 95% 75-125 0.5% 20   |



## Accuracy & Precision Summary

Batch: B172821  
 Lab Matrix: Water  
 Method: EPA 1631 E

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172821-SRM1 | Standard Reference Material (1741007, THg SRM NIST 1641d)<br>Hg |        | 15.68 | 15.33  | ng/L  | 98% 80-120   |              |
| B172821-MS4  | Matrix Spike (1742020-03)<br>Hg                                 | 0.63   | 6.122 | 5.86   | ng/L  | 85% 71-125   |              |
| B172821-MSD4 | Matrix Spike Duplicate (1742020-03)<br>Hg                       | 0.63   | 6.122 | 6.00   | ng/L  | 88% 71-125   | 2% 24        |
| B172821-MS5  | Matrix Spike (1742020-11)<br>Hg                                 | 0.19   | 6.122 | 5.72   | ng/L  | 90% 71-125   |              |
| B172821-MSD5 | Matrix Spike Duplicate (1742020-11)<br>Hg                       | 0.19   | 6.122 | 5.93   | ng/L  | 94% 71-125   | 4% 24        |



## Accuracy & Precision Summary

Batch: B173101  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte   | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|--------|--------|-------|--------------|--------------|
| B173101-BS1  | Blank Spike, (1722014)<br>Ni                        |        | 0.5000 | 0.5105 | µg/L  | 102% 75-125  |              |
| B173101-BS2  | Blank Spike, (1722014)<br>Ni                        |        | 0.5000 | 0.5110 | µg/L  | 102% 75-125  |              |
| B173101-BS3  | Blank Spike, (1722014)<br>Ni                        |        | 0.5000 | 0.5036 | µg/L  | 101% 75-125  |              |
| B173101-SRM1 | Standard Reference Material (1716086, NASS-7)<br>Ni |        | 0.2480 | 0.2602 | µg/L  | 105% 75-125  |              |
| B173101-SRM2 | Standard Reference Material (1741023, SLEW-3)<br>Ni |        | 1.230  | 1.429  | µg/L  | 116% 75-125  |              |
| B173101-DUP3 | Duplicate, (1742020-06)<br>Ni                       | 6.220  |        | 6.947  | µg/L  |              | 11% 20       |
| B173101-MS3  | Matrix Spike, (1742020-06)<br>Ni                    | 6.220  | 50.51  | 55.56  | µg/L  | 98% 75-125   |              |
| B173101-MSD3 | Matrix Spike Duplicate, (1742020-06)<br>Ni          | 6.220  | 50.51  | 56.37  | µg/L  | 99% 75-125   | 1% 20        |
| B173101-DUP2 | Duplicate, (1742020-07)<br>Ni                       | 3.610  |        | 3.710  | µg/L  |              | 3% 20        |
| B173101-MS2  | Matrix Spike, (1742020-07)<br>Ni                    | 3.610  | 10.10  | 13.72  | µg/L  | 100% 75-125  |              |
| B173101-MSD2 | Matrix Spike Duplicate, (1742020-07)<br>Ni          | 3.610  | 10.10  | 14.03  | µg/L  | 103% 75-125  | 2% 20        |



## Accuracy & Precision Summary

Batch: B173137  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte  | Native  | Spike | Result  | Units | REC & Limits | RPD & Limits |
|--------------|--|---------|-------|---------|-------|--------------|--------------|
| B173137-BS1  | <b>Blank Spike, (1738012)</b>  |         |       |         |       |              |              |
|              | Mg   |         | 400.0 | 379.7   | µg/L  | 95% 75-125   |              |
|              | Na   |         | 400.0 | 383.8   | µg/L  | 96% 75-125   |              |
| B173137-BS2  | <b>Blank Spike, (1738012)</b>  |         |       |         |       |              |              |
|              | Mg   |         | 400.0 | 385.7   | µg/L  | 96% 75-125   |              |
|              | Na   |         | 400.0 | 387.8   | µg/L  | 97% 75-125   |              |
| B173137-SRM1 | <b>Standard Reference Material (1724009, T221 as SRM)</b>            |         |       |         |       |              |              |
|              | Mg   |         | 3770  | 3641    | µg/L  | 97% 75-125   |              |
|              | Na   |         | 17400 | 16960   | µg/L  | 97% 75-125   |              |
| B173137-SRM2 | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |         |       |         |       |              |              |
|              | Mg   |         | 1059  | 994.5   | µg/L  | 94% N/A      |              |
|              | Na   |         | 3137  | 2968    | µg/L  | 95% N/A      |              |
| B173137-DUP3 | <b>Duplicate, (1741002-10)</b>                                       |         |       |         |       |              |              |
|              | Mg   | 1186000 |       | 1173000 | µg/L  |              | 1% 20        |
| B173137-MS3  | <b>Matrix Spike, (1741002-10)</b>                                    |         |       |         |       |              |              |
|              | Mg   | 1186000 | 20410 | 1185000 | µg/L  | NR 75-125    |              |
| B173137-MSD3 | <b>Matrix Spike Duplicate, (1741002-10)</b>                          |         |       |         |       |              |              |
|              | Mg   | 1186000 | 20410 | 1199000 | µg/L  | NR 75-125    | N/C 20       |
| B173137-DUP2 | <b>Duplicate, (1742020-10)</b>                                       |         |       |         |       |              |              |
|              | Mg   | 19200   |       | 19340   | µg/L  |              | 0.7% 20      |
|              | Na   | 27690   |       | 27920   | µg/L  |              | 0.8% 20      |
| B173137-MS2  | <b>Matrix Spike, (1742020-10)</b>                                    |         |       |         |       |              |              |
|              | Mg   | 19200   | 4082  | 23370   | µg/L  | NR 75-125    |              |
|              | Na   | 27690   | 4082  | 32170   | µg/L  | NR 75-125    |              |
| B173137-MSD2 | <b>Matrix Spike Duplicate, (1742020-10)</b>                          |         |       |         |       |              |              |
|              | Mg   | 19200   | 4082  | 23490   | µg/L  | NR 75-125    | N/C 20       |
|              | Na   | 27690   | 4082  | 32110   | µg/L  | NR 75-125    | N/C 20       |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173137  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample       | Analyte                                    | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B173137-DUP4 | Duplicate, (1742020-16)<br>Na              | 612700 |       | 628000 | µg/L  |              | 2% 20        |
| B173137-MS4  | Matrix Spike, (1742020-16)<br>Na           | 612700 | 20410 | 645800 | µg/L  | NR 75-125    |              |
| B173137-MSD4 | Matrix Spike Duplicate, (1742020-16)<br>Na | 612700 | 20410 | 631700 | µg/L  | NR 75-125    | N/C 20       |



## Method Blanks & Reporting Limits

**Batch:** B172708  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172708-BLK1    | 0.00         | µg/L  |                   |
| B172708-BLK2    | 0.00         | µg/L  |                   |
| B172708-BLK3    | 0.00         | µg/L  |                   |
| B172708-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B172708-BLK1    | -0.00004      | µg/L  |                   |
| B172708-BLK2    | -0.0007       | µg/L  |                   |
| B172708-BLK3    | -0.0005       | µg/L  |                   |
| B172708-BLK4    | -0.003        | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b>  |       | <b>MRL: 0.020</b> |

**Analyte:** DMA<sub>s</sub>

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172708-BLK1    | 0.00         | µg/L  |                   |
| B172708-BLK2    | 0.00         | µg/L  |                   |
| B172708-BLK3    | 0.00         | µg/L  |                   |
| B172708-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172708-BLK1    | 0.00          | µg/L         |                   |
| B172708-BLK2    | 0.00          | µg/L         |                   |
| B172708-BLK3    | 0.00          | µg/L         |                   |
| B172708-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL: 0.023</b> |



## Method Blanks & Reporting Limits

**Batch:** B172756  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Al

| Sample          | Result  | Units |                   |
|-----------------|---------|-------|-------------------|
| B172756-BLK1    | 0.041   | µg/L  |                   |
| B172756-BLK2    | -0.0006 | µg/L  |                   |
| B172756-BLK3    | 0.007   | µg/L  |                   |
| B172756-BLK4    | 0.039   | µg/L  |                   |
| <b>Average:</b> | 0.022   |       | <b>MDL:</b> 0.500 |
| <b>Limit:</b>   | 2.000   |       | <b>MRL:</b> 2.00  |

**Analyte:** As

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B172756-BLK1    | 0.0004 | µg/L  |                   |
| B172756-BLK2    | 0.0004 | µg/L  |                   |
| B172756-BLK3    | 0.0006 | µg/L  |                   |
| B172756-BLK4    | 0.0002 | µg/L  |                   |
| <b>Average:</b> | 0.000  |       | <b>MDL:</b> 0.011 |
| <b>Limit:</b>   | 0.040  |       | <b>MRL:</b> 0.040 |

**Analyte:** Ca

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B172756-BLK1    | 0.525  | µg/L  |                  |
| B172756-BLK2    | -0.037 | µg/L  |                  |
| B172756-BLK3    | -0.027 | µg/L  |                  |
| B172756-BLK4    | -0.041 | µg/L  |                  |
| <b>Average:</b> | 0.105  |       | <b>MDL:</b> 4.60 |
| <b>Limit:</b>   | 13.800 |       | <b>MRL:</b> 13.8 |





## Method Blanks & Reporting Limits

### Analyte: Cu

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.007        | µg/L  |                   |
| B172756-BLK2    | 0.005        | µg/L  |                   |
| B172756-BLK3    | 0.006        | µg/L  |                   |
| B172756-BLK4    | 0.007        | µg/L  |                   |
| <b>Average:</b> | <b>0.006</b> |       | <b>MDL: 0.022</b> |
| <b>Limit:</b>   | <b>0.066</b> |       | <b>MRL: 0.066</b> |

### Analyte: Fe

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B172756-BLK1    | 0.06        | µg/L  |                  |
| B172756-BLK2    | 0.02        | µg/L  |                  |
| B172756-BLK3    | 0.02        | µg/L  |                  |
| B172756-BLK4    | 0.01        | µg/L  |                  |
| <b>Average:</b> | <b>0.03</b> |       | <b>MDL: 0.28</b> |
| <b>Limit:</b>   | <b>0.85</b> |       | <b>MRL: 0.85</b> |

### Analyte: K

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B172756-BLK1    | -0.09       | µg/L  |                  |
| B172756-BLK2    | -0.09       | µg/L  |                  |
| B172756-BLK3    | -0.07       | µg/L  |                  |
| B172756-BLK4    | -0.1        | µg/L  |                  |
| <b>Average:</b> | <b>-0.1</b> |       | <b>MDL: 2.4</b>  |
| <b>Limit:</b>   | <b>10.0</b> |       | <b>MRL: 10.0</b> |

### Analyte: Mn

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.004        | µg/L  |                   |
| B172756-BLK2    | -0.00003     | µg/L  |                   |
| B172756-BLK3    | 0.003        | µg/L  |                   |
| B172756-BLK4    | 0.002        | µg/L  |                   |
| <b>Average:</b> | <b>0.002</b> |       | <b>MDL: 0.021</b> |
| <b>Limit:</b>   | <b>0.063</b> |       | <b>MRL: 0.063</b> |



## Method Blanks & Reporting Limits

### Analyte: Pb

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172756-BLK1    | 0.0004       | µg/L  |                   |
| B172756-BLK2    | 0.0003       | µg/L  |                   |
| B172756-BLK3    | 0.0003       | µg/L  |                   |
| B172756-BLK4    | -0.00005     | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.015</b> |       | <b>MRL: 0.015</b> |

### Analyte: Si

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B172756-BLK1    | 0.22         | µg/L  |                  |
| B172756-BLK2    | -0.001       | µg/L  |                  |
| B172756-BLK3    | -0.15        | µg/L  |                  |
| B172756-BLK4    | -0.32        | µg/L  |                  |
| <b>Average:</b> | <b>-0.06</b> |       | <b>MDL: 0.75</b> |
| <b>Limit:</b>   | <b>4.00</b>  |       | <b>MRL: 4.00</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
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## Method Blanks & Reporting Limits

**Batch:** B172821  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample       | Result               | Units |                                 |                  |
|--------------|----------------------|-------|---------------------------------|------------------|
| B172821-BLK1 | 0.26                 | ng/L  |                                 |                  |
| B172821-BLK2 | 0.20                 | ng/L  |                                 |                  |
| B172821-BLK3 | 0.10                 | ng/L  |                                 |                  |
| B172821-BLK4 | 0.15                 | ng/L  |                                 |                  |
|              | <b>Average:</b> 0.18 |       | <b>Standard Deviation:</b> 0.07 | <b>MDL:</b> 0.10 |
|              | <b>Limit:</b> 0.50   |       | <b>Limit:</b> 0.10              | <b>MRL:</b> 0.40 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
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## Method Blanks & Reporting Limits

**Batch:** B173101  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Ni

| Sample       | Result | Units |
|--------------|--------|-------|
| B173101-BLK1 | 0.0013 | µg/L  |
| B173101-BLK2 | 0.0019 | µg/L  |
| B173101-BLK3 | 0.0046 | µg/L  |
| B173101-BLK4 | 0.0062 | µg/L  |

**Average:** 0.0035  
**Limit:** 0.0300

**MDL:** 0.0070  
**MRL:** 0.0300



## Method Blanks & Reporting Limits

**Batch:** B173137  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Mg

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173137-BLK1    | 0.03        | µg/L  |                  |
| B173137-BLK2    | 0.02        | µg/L  |                  |
| B173137-BLK3    | 0.05        | µg/L  |                  |
| B173137-BLK4    | 0.02        | µg/L  |                  |
| <b>Average:</b> | <b>0.03</b> |       | <b>MDL: 0.54</b> |
| <b>Limit:</b>   | <b>1.70</b> |       | <b>MRL: 1.70</b> |

**Analyte:** Na

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173137-BLK1    | -0.402        | µg/L  |                   |
| B173137-BLK2    | -0.219        | µg/L  |                   |
| B173137-BLK3    | -0.405        | µg/L  |                   |
| B173137-BLK4    | -0.418        | µg/L  |                   |
| <b>Average:</b> | <b>-0.361</b> |       | <b>MDL: 0.650</b> |
| <b>Limit:</b>   | <b>1.300</b>  |       | <b>MRL: 1.30</b>  |

**Project ID:** PTC-OA1701  
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BAL Report 1742020  
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## Sample Containers

| <b>Lab ID:</b> 1742020-01                |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|--|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A3-1R-101617-8.2-13.2 |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                               | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B  | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C  | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-02                     |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|---|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A3-1R-101617-8.2-13.2-(20) |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                                    | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A   | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B   | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C   | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |
| D   | Vacutainer              | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |
| E   | EXTRA_VOL               | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-03                 |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|---|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A2-2R-101617-22.3-27.3 |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                                | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A   | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B   | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C   | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |

**Project ID:** PTC-OA1701  
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BAL Report 1742020  
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## Sample Containers

| <b>Lab ID:</b> 1742020-04                      |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|--|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A2-2R-101617-22.3-27.3-(20) |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                                     | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B  | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C  | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |
| D  | Vacutainer              | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |
| E  | EXTRA_VOL               | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-05       |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|---------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A7-1R-101617 |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                      | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                               | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B                               | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C                               | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |

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## Sample Containers

| <b>Lab ID:</b> 1742020-06            |                         | <b>Report Matrix:</b> Water |            |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|--------------------------------------|-------------------------|-----------------------------|------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A7-1R-101617-(20) |                         | <b>Sample Type:</b> Sample  |            |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | Bottle FLPE Hg-T        | 250 mL                      | 17-0105    | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B                                    | Bottle HDPE ICP-W       | 250 mL                      | n/a        | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C                                    | Bottle HDPE ICP-ChelCol | 250 mL                      | n/a        | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |
| D                                    | Vacutainer              | 6 mL                        | 16-0257    | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |
| E                                    | EXTRA_VOL               | 6 mL                        | 16-0257    | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-07       |                         | <b>Report Matrix:</b> Water |            |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|---------------------------------|-------------------------|-----------------------------|------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A6-2R-101617 |                         | <b>Sample Type:</b> Sample  |            |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                      | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                               | Bottle FLPE Hg-T        | 250 mL                      | 17-0105    | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B                               | Bottle HDPE ICP-W       | 250 mL                      | n/a        | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C                               | Bottle HDPE ICP-ChelCol | 250 mL                      | n/a        | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
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## Sample Containers

| <b>Lab ID:</b> 1742020-08            |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|--------------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A6-2R-101617-(20) |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B                                    | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C                                    | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |
| D                                    | Vacutainer              | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |
| E                                    | EXTRA_VOL               | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-09      |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|--------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-4B4-1-101617 |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                     | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                              | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B                              | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C                              | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
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## Sample Containers

| <b>Lab ID:</b> 1742020-10           |                         | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/16/2017 |              |           |                    |
|-------------------------------------|-------------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-4B4-1-101617-(20) |                         | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/17/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Bottle FLPE Hg-T        | 250 mL                      | 17-0105    | none                         | n/a          | n/a       | Cooler - 1742020   |
| B                                   | Bottle HDPE ICP-W       | 250 mL                      | n/a        | .2% HNO3 (BAL)               | 1740028      | <2        | Cooler - 1742020   |
| C                                   | Bottle HDPE ICP-ChelCol | 250 mL                      | n/a        | .1% Optima HNO3 (BAL)        | 1649047      | <2        | Cooler - 1742020   |
| D                                   | Vacutainer              | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          | n/a       | Cooler - 1742020   |
| E                                   | EXTRA_VOL               | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          | n/a       | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-11      |                         | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/16/2017 |              |           |                    |
|--------------------------------|-------------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-4B4-2-101617 |                         | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/17/2017  |              |           |                    |
| <b>Des</b>                     | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                              | Bottle FLPE Hg-T        | 250 mL                      | 17-0105    | none                         | n/a          | n/a       | Cooler - 1742020   |
| B                              | Bottle HDPE ICP-W       | 250 mL                      | n/a        | .2% HNO3 (BAL)               | 1740028      | <2        | Cooler - 1742020   |
| C                              | Bottle HDPE ICP-ChelCol | 250 mL                      | n/a        | .1% Optima HNO3 (BAL)        | 1649047      | <2        | Cooler - 1742020   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
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**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742020-12           |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |  |
|-------------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-4B4-2-101617-(20) |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |  |
| B                                   | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |  |
| C                                   | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |  |
| D                                   | Vacutainer              | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |  |
| E                                   | EXTRA_VOL               | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |  |

| <b>Lab ID:</b> 1742020-13           |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |  |
|-------------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-4B4-2-101617-(01) |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |  |
| B                                   | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |  |
| C                                   | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
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**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742020-14           |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |  |
|-------------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-4B4-2-101617-(21) |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |  |
| B                                   | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |  |
| C                                   | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |  |
| D                                   | Vacutainer              | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |  |
| E                                   | EXTRA_VOL               | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |  |

| <b>Lab ID:</b> 1742020-15       |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |  |
|---------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-5B1-1R-101617 |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |  |
| <b>Des</b>                      | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                               | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |  |
| B                               | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |  |
| C                               | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742020-16            |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |  |
|--------------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-5B1-1R-101617-(20) |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |  |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                    | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |  |
| B                                    | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |  |
| C                                    | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |  |
| D                                    | Vacutainer              | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |  |
| E                                    | EXTRA_VOL               | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |  |

| <b>Lab ID:</b> 1742020-17       |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |  |
|---------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-5B1-2R-101617 |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |  |
| <b>Des</b>                      | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                               | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |  |
| B                               | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |  |
| C                               | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742020-18            |                         |             | <b>Report Matrix:</b> Water |                       |              | <b>Collected:</b> 10/16/2017 |                    |
|--------------------------------------|-------------------------|-------------|-----------------------------|-----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-5B1-2R-101617-(20) |                         |             | <b>Sample Type:</b> Sample  |                       |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>   | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | Bottle FLPE Hg-T        | 250 mL      | 17-0105                     | none                  | n/a          | n/a                          | Cooler - 1742020   |
| B                                    | Bottle HDPE ICP-W       | 250 mL      | n/a                         | .2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1742020   |
| C                                    | Bottle HDPE ICP-ChelCol | 250 mL      | n/a                         | .1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1742020   |
| D                                    | Vacutainer              | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |
| E                                    | EXTRA_VOL               | 6 mL        | 16-0257                     | EDTA (PP)             | n/a          | n/a                          | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-19             |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/17/2017 |                    |
|---------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-5C16-1R-101717-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                            | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                     | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |
| B                                     | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-20             |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/17/2017 |                    |
|---------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-5C16-1R-101717-(21) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                            | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                     | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |
| B                                     | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |

| <b>Lab ID:</b> 1742020-21             |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/17/2017 |                    |
|---------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-5C16-2R-101717-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/17/2017  |                    |
| <b>Des</b>                            | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                     | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |
| B                                     | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742020  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742020-22            |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/17/2017 |                    |  |
|--------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-5C12-1-101717-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/17/2017  |                    |  |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                    | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |  |
| B                                    | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |  |

| <b>Lab ID:</b> 1742020-23            |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/17/2017 |                    |  |
|--------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-5C10-2-101717-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/17/2017  |                    |  |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                    | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |  |
| B                                    | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          | n/a                          | Cooler - 1742020   |  |

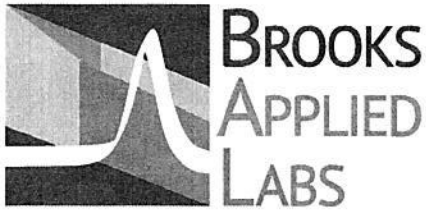
## Shipping Containers

### Cooler - 1742020

**Received:** October 17, 2017 14:43  
**Tracking No:** n/a via Courier  
**Coolant Type:** Ice  
**Temperature:** 5.0 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#10

**Custody seals present?** Ye  
**Custody seals intact?** Ye  
**COC present?** Ye



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

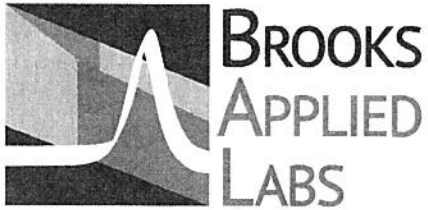
Received by: [Signature] For BAL use only Date: 10/17/17  
 Work Order ID: \_\_\_\_\_ Time: 1424  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                      |                | Client Sample Info |                      |                 |                                     | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |   |
|--|---------------------------------|----------------|--------------------|----------------------|-----------------|-------------------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|---|
|  | Date                            | Time           | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type                   | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |   |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> |                                 |                |                    |                      |                 |                                     |  |   |   |   |   |   |  |          |                                      |   |
| Sample ID  |                                 |                |                    |                      |                 |                                     |  |   |   |   |   |   |  |          |                                      |   |
| 1  | GW-3A3-1R-101617-8.2-B.2        | 10/16/17       | 1015               | Water                | 3               | N                                   | N  |   |   |   | X   |   |  |          |                                      | Dissolved Samples Field Filtered<br>0.45 um<br><br>Specify Here |
| 2  | GW-3A3-1R-101617-8.2-B.2-(20)   |                | 1025               |                      | 5               | Y                                   |  |   |   |   |   | X   | X  | X        |                                      |   |
| 3  | GW-3A2-2R-101617-22.3-27.3      |                | 1025               |                      | 3               | N                                   |  |   |   | X   |   |   |  |          |                                      |   |
| 4  | GW-3A2-2R-101617-22.3-27.3-(20) |                | 1025               |                      | 5               | Y                                   |  |   |   |   | X   | X   | X  |          |                                      |   |
| 5  | GW-3A7-1R-101617                |                | 1145               |                      | 3               | N                                   |  |   |   | X   |   |   |  |          |                                      |   |
| 6  | GW-3A7-1R-101617-(20)           |                | 1145               |                      | 5               | Y                                   |  |   |   |   | X   | X   | X  |          |                                      |   |
| 7  | GW-3A6-2R-101617                |                | 1200               |                      | 3               | N                                   |  |   |   | X   |   |   |  |          |                                      |   |
| 8  | GW-3A6-2R-101617-(20)           |                | 1200               |                      | 5               | Y                                   |  |   |   |   | X   | X   | X  |          |                                      |   |
| 9  | GW-4B4-1-101617                 |                | 1400               |                      | 3               | N                                   |  |   |   | X   |   |   |  |          |                                      |   |
| 10   | GW-4B4-1-101617-(20)            |                | 1400               |                      | 5               | Y                                   |  |   |   |   | X   | X   | X  |          |                                      |   |
| Trip Blank (specify)   |                                 |                |                    |                      |                 |                                     |  |   |   |   |   |   |  |          |                                      |   |
| Relinquished By: <u>[Signature]</u>  |                                 | Date: 10/17/17 |                    | Time: 1235           |                 | Relinquished By: <u>[Signature]</u> |  |   |   | Date: 10/17/17  |   | Time: 224 pm  |  |          |                                      |   |
| Received By: <u>[Signature]</u>  |                                 | Date: 10/17/17 |                    | Time: 1235 pm        |                 | Total Number of Packages: 1         |  |   |   |   |   |   |  |          |                                      |   |

Print





# Chain-of-Custody Form

BAL Report 1742020

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: HCH For BAL use only Date: 10 17 17  
Work Order ID: \_\_\_\_\_ Time: 14:24  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

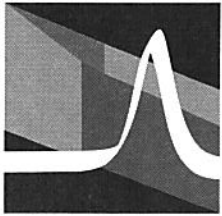
Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                  |                | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments                             |                                      |
|--|-----------------------------|----------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|--------------------------------------|--------------------------------------|
|  | Date                        | Time           | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |                                      | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> |                             |                |                    |                      |                 |                           |  |   |   |   |   |   |  |                                      |                                      |
| Sample ID  | Date                        | Time           | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 | Note: Field conductivity measurement | Specify Here                         |
| 1  | GW-4B4-2-101617             | 10/16/17       | 1330               | Water                | 3               | N                         | N  |   |   | X   |   |   |  |                                      |                                      |
| 2  | GW-4B4-2-101617-(20)        |                | 1330               |                      | 5               | Y                         |  |   |   |   | X   | X   | X  |                                      |                                      |
| 3  | GW-4B4-2-101617-(01)        |                | 1335               |                      | 3               | N                         |  |   |   | X   |   |   |  |                                      |                                      |
| 4  | GW-4B4-2-101617-(01)-(20)   |                | 1335               |                      | 5               | Y                         |  |   |   |   | X   | X   | Y  |                                      |                                      |
| 5  | GW-5B1-1R-101617            |                | 1515               |                      | 3               | N                         |  |   |   | X   |   |   |  |                                      |                                      |
| 6  | GW-5B1-1R-101617-(20)       |                | 1515               |                      | 5               | Y                         |  |   |   |   | X   | X   | Y  |                                      | <del>Sample tested on 10/17/17</del> |
| 7  | GW-5B1-2R-101617            |                | 1530               |                      | 3               | N                         |  |   |   | X   |   |   |  |                                      |                                      |
| 8  | GW-5B1-2R-101617-(20)       |                | 1530               |                      | 5               | Y                         |  |   |   |   | X   | X   | X  |                                      |                                      |
| 9  | GW-5C16-1R-101717-(20)      | 10/17/17       | 945                |                      | 2               | Y                         |  |   |   |   |   | X   |  |                                      |                                      |
| 10   | GW-5C16-1R-101717-(01)-(20) |                | 950                |                      | 2               | Y                         |  |   |   |   |   | X   |  |                                      |                                      |
| Trip Blank (specify)   |                             |                |                    |                      |                 |                           |  |   |   |   |   |   |  |                                      |                                      |
| Relinquished By: <u>Real Pnd</u>   |                             | Date: 10/17/17 |                    | Time: 1235           |                 | Relinquished By:          |  |   |   | Date:   |   | Time:   |  |                                      |                                      |
| Received By: <u>HCH</u>  |                             | Date: 10/17/17 |                    | Time: 1235           |                 | Total Number of Packages: |  |   |   |   |   |   |  |                                      |                                      |

Print



**BROOKS  
APPLIED  
LABS**

# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

BAL Report 1742020

For BAL use only  
 Received by: HCH Date: 10/17/17  
 Work Order ID: \_\_\_\_\_ Time: 14:24  
 Project ID: \_\_\_\_\_

Client: Port of Tacoma (Pioneer/DOF) PO Number: 79224  
 Contact: Troy Bussey (Pioneer) Phone: 360-570-1700  
 Client Project ID: Artema FSDg Inv Email: busseyt@vspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466

Mailing Address: Invoice: POF Report: Troy Bussey  
PO Box 1837 5205 Corporate Center  
Tacoma, WA 98401 Ct. SE Ste A, Olympia 9  
 Email Receipt Confirmation? (Yes) No  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                   |                     | Client Sample Info        |                      |                             |  |                    | BAL Analyses Required |                            |   |   |            |                 | Comments |                                |
|--|------------------------------|---------------------|---------------------------|----------------------|-----------------------------|--|--------------------|-----------------------|----------------------------|---|---|------------|-----------------|----------|--------------------------------|
|  | Date                         | Time                | Matrix Type               | Number of Containers | Field Filtered?<br>(Yes/No) | Preservation Type<br>HCl/HNO <sub>3</sub> /Other | Total Hg, EPA 1631 | Methyl Hg, EPA 1630   | ICP-MS Metals<br>(specify) | As Species (specify)<br>InOrg, III, V, MMA, DMA | Se Species (specify)<br>Se(IV), Se(VI), SeCN, Unknown | Filtration | Other (specify) |          | Other (specify)                |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Specify Here                 |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| 1  | <u>GW-546-2R-101717-(20)</u> | <u>10/17/17</u>     | <u>955</u>                | <u>Water</u>         | <u>2</u>                    | <u>Y</u>   | <u>N</u>           |                       |                            |   | <u>X</u>  |            |                 |          | <u>Per work plan Table 4-7</u> |
| 2  | <u>GW-542-1-101717-(20)</u>  | <u>10/17/17</u>     | <u>1100</u>               | <u>↓</u>             | <u>↓</u>                    | <u>↓</u>   | <u>↓</u>           |                       |                            |   | <u>X</u>  |            |                 |          |                                |
| 3  | <u>GW-540-2-101717-(20)</u>  | <u>10/17/17</u>     | <u>1115</u>               | <u>↓</u>             | <u>↓</u>                    | <u>↓</u>   | <u>↓</u>           |                       |                            |   | <u>X</u>  |            |                 |          |                                |
| 4  |                              |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| 5  |                              |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| 6  |                              |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| 7  |                              |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| 8  |                              |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| 9  |                              |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| 10   |                              |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| Trip Blank   |                              |                     |                           |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |
| Relinquished By: <u>Leah P...</u>  | Date: <u>10/17/17</u>        | Time: <u>1235</u>   | Relinquished By:          | Date:                | Time:                       |  |                    |                       |                            |   |   |            |                 |          |                                |
| Received By: <u>[Signature]</u>  | Date: <u>10/17/17</u>        | Time: <u>1235pm</u> | Total Number of Packages: |                      |                             |  |                    |                       |                            |   |   |            |                 |          |                                |





18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 16, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On October 19, 2017, Brooks Applied Labs (BAL) received eighteen (18) water samples in acceptable condition. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The client samples GW-4C1-1-101717-(20) and GW-5C14-2-101717-(20) arrived with the shipment but these samples were not listed on the chain-of-custody (COC) forms. The samples were added to the COC (COC, page 2, rows 7 and 8) by Brooks Applied Labs sample reception staff and logged in for arsenic speciation analyses.

The samples submitted for arsenic speciation analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

#### *Arsenic Speciation Analysis by IC-ICP-CRC-MS*

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C). Instances where the matrix spike/matrix spike duplicate (MS/MSD) sets were spiked at a concentration less than 25% of the native sample result, the recoveries were not reported (NR). Spike recoveries are not a valid indicator of data quality when the analyte concentration in the source sample is greater than the spiking level.

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Project Manager  
jeremy@brooksapplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                | Lab ID     | Report Matrix | Type         | Sampled    | Received   |
|-----------------------|------------|---------------|--------------|------------|------------|
| GW-5C13-1-101717-(20) | 1742045-01 | Water         | QC Sample    | 10/17/2017 | 10/19/2017 |
| GW-5D8-2-101717-(20)  | 1742045-02 | Water         | Sample       | 10/17/2017 | 10/19/2017 |
| GW-5E2-1-101817-(20)  | 1742045-03 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| GW-4D1-1-101817-(20)  | 1742045-04 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| GW-4E1-2-101817-(20)  | 1742045-05 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| GW-5E1-1-101817-(20)  | 1742045-06 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| GW-5F1-1-101817-(20)  | 1742045-07 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| GW-5E8-1-101817-(20)  | 1742045-08 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| GW-5E1-2-101817-(20)  | 1742045-09 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| EB-101717-(20)        | 1742045-10 | Water         | Equip. Blank | 10/17/2017 | 10/19/2017 |
| GW-4F1-2-101817-(20)  | 1742045-11 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| GW-4F1-2-101817-(21)  | 1742045-12 | Water         | Sample       | 10/18/2017 | 10/19/2017 |
| EB-101817-(20)        | 1742045-13 | Water         | Equip. Blank | 10/18/2017 | 10/19/2017 |
| GW-5D7-1R-101917-(20) | 1742045-14 | Water         | QC Sample    | 10/19/2017 | 10/19/2017 |
| GW-5D5-1-101917-(20)  | 1742045-15 | Water         | Sample       | 10/19/2017 | 10/19/2017 |
| GW-5E4-1-101917-(20)  | 1742045-16 | Water         | Sample       | 10/19/2017 | 10/19/2017 |
| GW-4C1-1-101717-(20)  | 1742045-17 | Water         | Sample       | 10/17/2017 | 10/19/2017 |
| GW-5C14-2-101717-(20) | 1742045-18 | Water         | Sample       | 10/17/2017 | 10/19/2017 |

## Batch Summary

| Analyte | Lab Matrix | Method       | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|--------------|------------|------------|---------|----------|
| As(III) | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| As(III) | Water      | SOP BAL-4100 | 10/31/2017 | 10/31/2017 | B172942 | 1701346  |
| As(V)   | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| As(V)   | Water      | SOP BAL-4100 | 10/31/2017 | 10/31/2017 | B172942 | 1701346  |
| DMAs    | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| DMAs    | Water      | SOP BAL-4100 | 10/31/2017 | 10/31/2017 | B172942 | 1701346  |
| MMAAs   | Water      | SOP BAL-4100 | 10/24/2017 | 10/25/2017 | B172708 | 1701318  |
| MMAAs   | Water      | SOP BAL-4100 | 10/31/2017 | 10/31/2017 | B172942 | 1701346  |



## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-5C13-1-101717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742045-01                   | As(III) | Water         | D     | 499     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-01                   | As(V)   | Water         | D     | 958     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-01                   | DMAs    | Water         | D     | 0.285   | J         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-01                   | MMAs    | Water         | D     | 0.933   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5D8-2-101717-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742045-02                   | As(III) | Water         | D     | 0.490   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-02                   | As(V)   | Water         | D     | 1.14    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-02                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-02                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5E2-1-101817-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742045-03                   | As(III) | Water         | D     | 266     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-03                   | As(V)   | Water         | D     | 117     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-03                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-03                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-4D1-1-101817-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742045-04                   | As(III) | Water         | D     | 31.6    |           | 2.00  | 10.0 | µg/L | B172942 | 1701346  |
| 1742045-04                   | As(V)   | Water         | D     | 2210    |           | 2.00  | 10.0 | µg/L | B172942 | 1701346  |
| 1742045-04                   | DMAs    | Water         | D     | ≤ 2.50  | U         | 2.50  | 10.5 | µg/L | B172942 | 1701346  |
| 1742045-04                   | MMAs    | Water         | D     | 2.61    | J         | 2.00  | 11.5 | µg/L | B172942 | 1701346  |
| <b>GW-4E1-2-101817-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742045-05                   | As(III) | Water         | D     | 0.258   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1742045-05                   | As(V)   | Water         | D     | 0.534   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1742045-05                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1742045-05                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-5E1-1-101817-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742045-06                   | As(III) | Water         | D     | 576     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-06                   | As(V)   | Water         | D     | 133     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-06                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-06                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |



## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-5F1-1-101817-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742045-07                  | As(III) | Water         | D     | 8.65    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-07                  | As(V)   | Water         | D     | 98.0    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-07                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-07                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5E8-1-101817-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742045-08                  | As(III) | Water         | D     | 311     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-08                  | As(V)   | Water         | D     | 131     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-08                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-08                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5E1-2-101817-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742045-09                  | As(III) | Water         | D     | 42.4    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-09                  | As(V)   | Water         | D     | 261     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-09                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-09                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>EB-101717-(20)</b>       |         |               |       |         |           |       |      |      |         |          |
| 1742045-10                  | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-10                  | As(V)   | Water         | D     | 0.494   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-10                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-10                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-4F1-2-101817-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742045-11                  | As(III) | Water         | D     | 2.57    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-11                  | As(V)   | Water         | D     | 1.12    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-11                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-11                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-4F1-2-101817-(21)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742045-12                  | As(III) | Water         | D     | 2.56    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-12                  | As(V)   | Water         | D     | 1.46    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-12                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-12                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |





## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>EB-101817-(20)</b>        |         |               |       |         |           |       |      |      |         |          |
| 1742045-13                   | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-13                   | As(V)   | Water         | D     | 0.451   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-13                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-13                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5D7-1R-101917-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742045-14                   | As(III) | Water         | D     | 82600   |           | 200   | 1000 | µg/L | B172708 | 1701318  |
| 1742045-14                   | As(V)   | Water         | D     | 8030    |           | 200   | 1000 | µg/L | B172708 | 1701318  |
| 1742045-14                   | DMAs    | Water         | D     | ≤ 250   | U         | 250   | 1050 | µg/L | B172708 | 1701318  |
| 1742045-14                   | MMAs    | Water         | D     | ≤ 200   | U         | 200   | 1150 | µg/L | B172708 | 1701318  |
| <b>GW-5D5-1-101917-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742045-15                   | As(III) | Water         | D     | 22600   |           | 80.0  | 400  | µg/L | B172708 | 1701318  |
| 1742045-15                   | As(V)   | Water         | D     | 19900   |           | 80.0  | 400  | µg/L | B172708 | 1701318  |
| 1742045-15                   | DMAs    | Water         | D     | ≤ 100   | U         | 100   | 420  | µg/L | B172708 | 1701318  |
| 1742045-15                   | MMAs    | Water         | D     | ≤ 80.0  | U         | 80.0  | 460  | µg/L | B172708 | 1701318  |
| <b>GW-5E4-1-101917-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742045-16                   | As(III) | Water         | D     | 101000  |           | 200   | 1000 | µg/L | B172708 | 1701318  |
| 1742045-16                   | As(V)   | Water         | D     | 3030    |           | 200   | 1000 | µg/L | B172708 | 1701318  |
| 1742045-16                   | DMAs    | Water         | D     | ≤ 250   | U         | 250   | 1050 | µg/L | B172708 | 1701318  |
| 1742045-16                   | MMAs    | Water         | D     | ≤ 200   | U         | 200   | 1150 | µg/L | B172708 | 1701318  |
| <b>GW-4C1-1-101717-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1742045-17                   | As(III) | Water         | D     | 1.57    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-17                   | As(V)   | Water         | D     | 66.2    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-17                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-17                   | MMAs    | Water         | D     | 0.507   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5C14-2-101717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1742045-18                   | As(III) | Water         | D     | 8.02    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-18                   | As(V)   | Water         | D     | 251     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1742045-18                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1742045-18                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |



## Accuracy & Precision Summary

Batch: B172708  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.034  | µg/L  | 100% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.950  | µg/L  | 99% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.916  | µg/L  | 91% 75-125   |              |
| B172708-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMA   |        | 4.634 | 4.697  | µg/L  | 101% 75-125  |              |
| B172708-DUP6 | <b>Duplicate, (1742045-01)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 499.3  |       | 509.4  | µg/L  |              | 2% 25        |
|              | As(V)                                       | 958.3  |       | 977.6  | µg/L  |              | 2% 25        |
|              | DMAs  | 0.285  |       | 0.343  | µg/L  |              | 19% 25       |
|              | MMA   | 0.933  |       | 0.823  | µg/L  |              | 13% 25       |
| B172708-MS6  | <b>Matrix Spike, (1742045-01)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 499.3  | 50.00 | 584.7  | µg/L  | NR 75-125    |              |
|              | As(V)                                       | 958.3  | 50.00 | 1026   | µg/L  | NR 75-125    |              |
|              | DMAs  | 0.285  | 51.00 | 55.54  | µg/L  | 108% 75-125  |              |
|              | MMA   | 0.933  | 50.00 | 53.91  | µg/L  | 106% 75-125  |              |
| B172708-MSD6 | <b>Matrix Spike Duplicate, (1742045-01)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 499.3  | 50.00 | 559.7  | µg/L  | NR 75-125    | N/C 25       |
|              | As(V)                                       | 958.3  | 50.00 | 1022   | µg/L  | NR 75-125    | N/C 25       |
|              | DMAs  | 0.285  | 51.00 | 55.62  | µg/L  | 109% 75-125  | 0.1% 25      |
|              | MMA   | 0.933  | 50.00 | 54.18  | µg/L  | 106% 75-125  | 0.5% 25      |
| B172708-DUPA | <b>Duplicate, (1742045-14)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 82630  |       | 83460  | µg/L  |              | 1% 25        |
|              | As(V)                                       | 8026   |       | 8697   | µg/L  |              | 8% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMA   | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172708-MSA  | <b>Matrix Spike, (1742045-14)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 82630  | 50000 | 137400 | µg/L  | 110% 75-125  |              |
|              | As(V)                                       | 8026   | 50000 | 61870  | µg/L  | 108% 75-125  |              |
|              | DMAs  | ND     | 51000 | 54220  | µg/L  | 106% 75-125  |              |
|              | MMA   | ND     | 50000 | 53960  | µg/L  | 108% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742045  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B172708  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B172708-MSDA | Matrix Spike Duplicate, (1742045-14) |        |       |        |       |              |              |
|              | As(III)                              | 82630  | 50000 | 135200 | µg/L  | 105% 75-125  | 2% 25        |
|              | As(V)                                | 8026   | 50000 | 61680  | µg/L  | 107% 75-125  | 0.3% 25      |
|              | DMAs                                 | ND     | 51000 | 53220  | µg/L  | 104% 75-125  | 2% 25        |
|              | MMAs                                 | ND     | 50000 | 52880  | µg/L  | 106% 75-125  | 2% 25        |



## Accuracy & Precision Summary

Batch: B172942  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172942-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.058  | µg/L  | 101% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.588  | µg/L  | 92% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.875  | µg/L  | 90% 75-125   |              |
| B172942-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMA   |        | 4.634 | 4.693  | µg/L  | 101% 75-125  |              |
| B172942-DUP1 | <b>Duplicate, (1743031-05)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 2.718  |       | 3.836  | µg/L  |              | 34% 25       |
|              | As(V)                                       | 20.18  |       | 19.82  | µg/L  |              | 2% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMA   | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172942-MS1  | <b>Matrix Spike, (1743031-05)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 2.718  | 50.00 | 51.64  | µg/L  | 98% 75-125   |              |
|              | As(V)                                       | 20.18  | 50.00 | 69.66  | µg/L  | 99% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 50.60  | µg/L  | 99% 75-125   |              |
|              | MMA   | ND     | 50.00 | 49.24  | µg/L  | 98% 75-125   |              |
| B172942-MSD1 | <b>Matrix Spike Duplicate, (1743031-05)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 2.718  | 50.00 | 50.29  | µg/L  | 95% 75-125   | 3% 25        |
|              | As(V)                                       | 20.18  | 50.00 | 67.85  | µg/L  | 95% 75-125   | 3% 25        |
|              | DMAs  | ND     | 51.00 | 50.03  | µg/L  | 98% 75-125   | 1% 25        |
|              | MMA   | ND     | 50.00 | 47.91  | µg/L  | 96% 75-125   | 3% 25        |
| B172942-DUP2 | <b>Duplicate, (1743049-07)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  |       | 20.03  | µg/L  |              | 9% 25        |
|              | As(V)                                       | 59.49  |       | 58.51  | µg/L  |              | 2% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMA   | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172942-MS2  | <b>Matrix Spike, (1743049-07)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  | 50.00 | 65.63  | µg/L  | 95% 75-125   |              |
|              | As(V)                                       | 59.49  | 50.00 | 107.4  | µg/L  | 96% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 48.95  | µg/L  | 96% 75-125   |              |
|              | MMA   | ND     | 50.00 | 47.68  | µg/L  | 95% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742045  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B172942  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172942-MSD2 | <b>Matrix Spike Duplicate, (1743049-07)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  | 50.00 | 73.58  | µg/L  | 111% 75-125  | 11% 25       |
|              | As(V)                                       | 59.49  | 50.00 | 105.3  | µg/L  | 92% 75-125   | 2% 25        |
|              | DMAs  | ND     | 51.00 | 48.57  | µg/L  | 95% 75-125   | 0.8% 25      |
|              | MMAs  | ND     | 50.00 | 46.80  | µg/L  | 94% 75-125   | 2% 25        |



## Method Blanks & Reporting Limits

**Batch:** B172708  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172708-BLK1    | 0.00         | µg/L  |                   |
| B172708-BLK2    | 0.00         | µg/L  |                   |
| B172708-BLK3    | 0.00         | µg/L  |                   |
| B172708-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B172708-BLK1    | -0.00004      | µg/L  |                   |
| B172708-BLK2    | -0.0007       | µg/L  |                   |
| B172708-BLK3    | -0.0005       | µg/L  |                   |
| B172708-BLK4    | -0.003        | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b>  |       | <b>MRL: 0.020</b> |

**Analyte:** DMAs

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172708-BLK1    | 0.00         | µg/L  |                   |
| B172708-BLK2    | 0.00         | µg/L  |                   |
| B172708-BLK3    | 0.00         | µg/L  |                   |
| B172708-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742045  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172708-BLK1    | 0.00          | µg/L         |                   |
| B172708-BLK2    | 0.00          | µg/L         |                   |
| B172708-BLK3    | 0.00          | µg/L         |                   |
| B172708-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL: 0.023</b> |



## Method Blanks & Reporting Limits

**Batch:** B172942  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.00         | µg/L  |                   |
| B172942-BLK2    | 0.00         | µg/L  |                   |
| B172942-BLK3    | 0.00         | µg/L  |                   |
| B172942-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.003        | µg/L  |                   |
| B172942-BLK2    | 0.002        | µg/L  |                   |
| B172942-BLK3    | 0.002        | µg/L  |                   |
| B172942-BLK4    | 0.001        | µg/L  |                   |
| <b>Average:</b> | <b>0.002</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** DMAs

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.00         | µg/L  |                   |
| B172942-BLK2    | 0.00         | µg/L  |                   |
| B172942-BLK3    | 0.00         | µg/L  |                   |
| B172942-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742045  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172942-BLK1    | 0.00          | µg/L         |                   |
| B172942-BLK2    | 0.00          | µg/L         |                   |
| B172942-BLK3    | 0.00          | µg/L         |                   |
| B172942-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL: 0.023</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742045  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742045-01            |                  |             | <b>Report Matrix:</b> Water   |                     |              | <b>Collected:</b> 10/17/2017 |                    |  |
|--------------------------------------|------------------|-------------|-------------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-5C13-1-101717-(20) |                  |             | <b>Sample Type:</b> QC Sample |                     |              | <b>Received:</b> 10/19/2017  |                    |  |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b> | <b>Lot</b>                    | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                    | Vacutainer       | 6 mL        | 16-0257                       | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                    | EXTRA_VOL        | 6 mL        | 16-0257                       | EDTA (PP)           | n/a          |                              | Cooler             |  |

| <b>Lab ID:</b> 1742045-02           |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/17/2017 |                    |  |
|-------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-5D8-2-101717-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/19/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |

| <b>Lab ID:</b> 1742045-03           |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/18/2017 |                    |  |
|-------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-5E2-1-101817-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/19/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |

| <b>Lab ID:</b> 1742045-04           |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/18/2017 |                    |  |
|-------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-4D1-1-101817-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/19/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |

| <b>Lab ID:</b> 1742045-05           |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/18/2017 |                    |  |
|-------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-4E1-2-101817-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/19/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742045  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742045-06           |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/18/2017 |    |             |
|-------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-5E1-1-101817-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                                 | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1742045-07           |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/18/2017 |    |             |
|-------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-5F1-1-101817-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                                 | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1742045-08           |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/18/2017 |    |             |
|-------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-5E8-1-101817-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                                 | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1742045-09           |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/18/2017 |    |             |
|-------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-5E1-2-101817-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                                 | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1742045-10     |            |      | <b>Report Matrix:</b> Water      |              | <b>Collected:</b> 10/17/2017 |    |             |
|-------------------------------|------------|------|----------------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> EB-101717-(20) |            |      | <b>Sample Type:</b> Equip. Blank |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                           | Container  | Size | Lot                              | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                             | Vacutainer | 6 mL | 16-0257                          | EDTA (PP)    | n/a                          |    | Cooler      |
| B                             | EXTRA_VOL  | 6 mL | 16-0257                          | EDTA (PP)    | n/a                          |    | Cooler      |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742045  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742045-11           |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/18/2017 |    |             |
|-------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-4F1-2-101817-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                                 | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1742045-12           |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/18/2017 |    |             |
|-------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-4F1-2-101817-(21) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                                 | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1742045-13     |            |      | <b>Report Matrix:</b> Water      |              | <b>Collected:</b> 10/18/2017 |    |             |
|-------------------------------|------------|------|----------------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> EB-101817-(20) |            |      | <b>Sample Type:</b> Equip. Blank |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                           | Container  | Size | Lot                              | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                             | Vacutainer | 6 mL | 16-0257                          | EDTA (PP)    | n/a                          |    | Cooler      |
| B                             | EXTRA_VOL  | 6 mL | 16-0257                          | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1742045-14            |            |      | <b>Report Matrix:</b> Water   |              | <b>Collected:</b> 10/19/2017 |    |             |
|--------------------------------------|------------|------|-------------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-5D7-1R-101917-(20) |            |      | <b>Sample Type:</b> QC Sample |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                                  | Container  | Size | Lot                           | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                    | Vacutainer | 6 mL | 16-0257                       | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                    | EXTRA_VOL  | 6 mL | 16-0257                       | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1742045-15           |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/19/2017 |    |             |
|-------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-5D5-1-101917-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/19/2017  |    |             |
| Des                                 | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1742045  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1742045-16           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/19/2017 |       |    |             |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|-------------|
| <b>Sample:</b> GW-5E4-1-101917-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/19/2017  |       |    |             |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler      |

| <b>Lab ID:</b> 1742045-17           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/17/2017 |       |    |             |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|-------------|
| <b>Sample:</b> GW-4C1-1-101717-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/19/2017  |       |    |             |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont. |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler      |
| B                                   | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler      |

| <b>Lab ID:</b> 1742045-18            |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/17/2017 |       |    |             |
|--------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|-------------|
| <b>Sample:</b> GW-5C14-2-101717-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/19/2017  |       |    |             |
| Des                                  | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont. |
| A                                    | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler      |
| B                                    | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler      |

## Shipping Containers

### Cooler

**Received:** October 19, 2017 13:12  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 2.5 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes





# Chain-of-Custody Form

BAL Report 1742045

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

For BAL use only  
Received by: See Date: 10/19/17  
Work Order ID: 1742045 Time: 13:12  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection           |                       | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|----------------------|-----------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                 | Time                  | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-6 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID            |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|  | 1                    | GW-5C13-1-101717-(20) | 10/17/17           | 1400                 | water           | 2                         | Y  | Z   |   |   |   |   | X  |          | 8MS<br>MS/MSD                        |
|  | 2                    | GW-5D8-2-101717-(20)  | ↓                  | 1410                 |                 |                           |  |   |   |   |   |   | X  |          | 18MS                                 |
|  | 3                    | GW-5E2-1-101817-(20)  | 10/18/17           | 855                  |                 |                           |  |   |   |   |   |   | X  |          | 2MS                                  |
|  | 4                    | GW-4D1-1-101817-(20)  | ↓                  | 900                  |                 |                           |  |   |   |   |   |   | X  |          | 1MS                                  |
|  | 5                    | GW-4E1-2-101817-(20)  | ↓                  | 1025                 |                 |                           |  |   |   |   |   |   | X  |          | 22MS                                 |
|  | 6                    | GW-5E1-1-101817-(20)  | ↓                  | 1030                 |                 |                           |  |   |   |   |   |   | X  |          | 500S                                 |
|  | 7                    | GW-5F1-1-101817-(20)  | ↓                  | 1130                 |                 |                           |  |   |   |   |   |   | X  |          | 18MS                                 |
|  | 8                    | GW-5EB-1-101817-(20)  | ↓                  | 1145                 |                 |                           |  |   |   |   |   |   | X  |          | 500S                                 |
|  | 9                    | GW-5E1-2-101817-(20)  | ↓                  | 1305                 |                 |                           |  |   |   |   |   |   | X  |          | 16MS                                 |
|  | 10                   | EB-101717-(20)        | 10/17/17           | 1500                 |                 |                           |  |   |   |   |   |   | X  |          | —                                    |
|  | Trip Blank (specify) |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Leah Paul</u>  |                      | Date: <u>10/19/17</u> |                    | Time: <u>13:12</u>   |                 | Relinquished By:          |  | Date:   |   | Time:   |   |   |  |          |                                      |
| Received By: <u>See</u>  |                      | Date: <u>10/19/17</u> |                    | Time: <u>13:12</u>   |                 | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |



# Chain-of-Custody Form

BAL Report 1742045

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: SEC For BAL use only Date: 10/19/17  
Work Order ID: 1742045 Time: 13:12  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503  
Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT (business days)                     | Collection            |  | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|-----------------------|--|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                  | Time   | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard) | Sample ID             |  |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| <input type="checkbox"/> 15*                      | 1                     | GW-4F1-2-101817-(20)                           | 10/18/17           | 1300                 | Water           | 2                         | Y  | N   |   |   |   |   | X  |          | 15MS                                 |
| <input type="checkbox"/> 10*                      | 2                     | GW-4F1-2-101817-(21)                           | ↓                  | 1305                 | ↓               | ↓                         | ↓  | ↓   |   |   |   |   | X  |          | 15MS                                 |
| <input type="checkbox"/> 5*                       | 3                     | <del>GW-4F1-2-101817-(20)</del> EB-101817-(20) | ↓                  | 1400                 | ↓               | ↓                         | ↓  | ↓   |   |   |   |   | X  |          | -                                    |
| <input type="checkbox"/> Other _____              | 4                     | GW-5D7-1R-101917-(20)                          | 10/19/17           | 9:00                 | ↓               | ↓                         | ↓  | ↓   |   |   |   |   | X  |          | 1MS MS/MSD                           |
| <i>*Surcharges may apply to expedited TATs</i>    | 5                     | GW-5D5-1-101917-(20)                           | ↓                  | 9:10                 | ↓               | ↓                         | ↓  | ↓   |   |   |   |   | X  |          | 10MS                                 |
|   | 6                     | GW-5E4-1-101917-(20)                           | ↓                  | 10:30                | ↓               | ↓                         | ↓  | ↓   |   |   |   |   | X  |          |                                      |
|   | 7                     | GW-4C1-1-101717-(20)                           | 10/17/17           | 12:30                | Water           | 2                         | Y  | N   |   |   |   |   | X  |          |                                      |
|   | 8                     | GW-5C14-2-101717-(20)                          | ↓                  | 12:25                | ↓               | ↓                         | ↓  | ↓   |   |   |   |   | X  |          |                                      |
|   | 9                     |  |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | 10                    |  |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
|   | Trip Blank (specify)  |  |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>LB</u>                        | Date: <u>10/19/17</u> | Time: <u>1312</u>                              | Relinquished By:   | Date:                | Time:           | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |
| Received By: <u>SEC</u>                           | Date: <u>10/19/17</u> | Time: <u>1312</u>                              |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |

Print



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 16, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On October 23, 2017, Brooks Applied Labs (BAL) received seven (7) water samples in acceptable condition. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody form.

The samples submitted for arsenic speciation analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

#### Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C). Instances where the matrix spike/matrix spike duplicate (MS/MSD) sets were spiked at a concentration less than 25% of the native sample result, the recoveries were not reported (**NR**). Spike recoveries are not a valid indicator of data quality when the analyte concentration in the source sample is greater than the spiking level.

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.



Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish extending to the right.

Jeremy Maute  
Senior Project Manager  
jeremy@brooksapplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|-----------------------|------------|---------------|--------|------------|------------|
| GW-6E5-1-102017-(20)  | 1743007-01 | Water         | Sample | 10/20/2017 | 10/23/2017 |
| GW-6F1-2-102017-(20)  | 1743007-02 | Water         | Sample | 10/20/2017 | 10/23/2017 |
| GW-6F2-1-102017-(20)  | 1743007-03 | Water         | Sample | 10/20/2017 | 10/23/2017 |
| GW-5G1-1-102017-(20)  | 1743007-04 | Water         | Sample | 10/20/2017 | 10/23/2017 |
| GW-6G1-1-102017-(20)  | 1743007-05 | Water         | Sample | 10/20/2017 | 10/23/2017 |
| GW-5C21-2-102017-(20) | 1743007-06 | Water         | Sample | 10/20/2017 | 10/23/2017 |
| GW-4C2-1-102017-(20)  | 1743007-07 | Water         | Sample | 10/20/2017 | 10/23/2017 |

## Batch Summary

| Analyte | Lab Matrix | Method       | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|--------------|------------|------------|---------|----------|
| As(III) | Water      | SOP BAL-4100 | 10/24/2017 | 10/26/2017 | B172708 | 1701318  |
| As(V)   | Water      | SOP BAL-4100 | 10/24/2017 | 10/26/2017 | B172708 | 1701318  |
| DMAs    | Water      | SOP BAL-4100 | 10/24/2017 | 10/26/2017 | B172708 | 1701318  |
| MMA     | Water      | SOP BAL-4100 | 10/24/2017 | 10/26/2017 | B172708 | 1701318  |



## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-6E5-1-102017-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743007-01                   | As(III) | Water         | D     | 38400   |           | 80.0  | 400  | µg/L | B172708 | 1701318  |
| 1743007-01                   | As(V)   | Water         | D     | 3520    |           | 80.0  | 400  | µg/L | B172708 | 1701318  |
| 1743007-01                   | DMAs    | Water         | D     | ≤ 100   | U         | 100   | 420  | µg/L | B172708 | 1701318  |
| 1743007-01                   | MMAs    | Water         | D     | ≤ 80.0  | U         | 80.0  | 460  | µg/L | B172708 | 1701318  |
| <b>GW-6F1-2-102017-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743007-02                   | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-02                   | As(V)   | Water         | D     | 0.259   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-02                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1743007-02                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-6F2-1-102017-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743007-03                   | As(III) | Water         | D     | 0.966   | J         | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-03                   | As(V)   | Water         | D     | 67.4    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-03                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1743007-03                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5G1-1-102017-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743007-04                   | As(III) | Water         | D     | 161     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-04                   | As(V)   | Water         | D     | 202     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-04                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1743007-04                   | MMAs    | Water         | D     | 0.255   | J         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-6G1-1-102017-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743007-05                   | As(III) | Water         | D     | 1.04    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-05                   | As(V)   | Water         | D     | 306     |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-05                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1743007-05                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |
| <b>GW-5C21-2-102017-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743007-06                   | As(III) | Water         | D     | 977     |           | 2.00  | 10.0 | µg/L | B172708 | 1701318  |
| 1743007-06                   | As(V)   | Water         | D     | 1370    |           | 2.00  | 10.0 | µg/L | B172708 | 1701318  |
| 1743007-06                   | DMAs    | Water         | D     | ≤ 2.50  | U         | 2.50  | 10.5 | µg/L | B172708 | 1701318  |
| 1743007-06                   | MMAs    | Water         | D     | ≤ 2.00  | U         | 2.00  | 11.5 | µg/L | B172708 | 1701318  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-4C2-1-102017-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743007-07                  | As(III) | Water         | D     | 2.39    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-07                  | As(V)   | Water         | D     | 1.61    |           | 0.200 | 1.00 | µg/L | B172708 | 1701318  |
| 1743007-07                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172708 | 1701318  |
| 1743007-07                  | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172708 | 1701318  |



## Accuracy & Precision Summary

Batch: B172708  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172708-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.034  | µg/L  | 100% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.950  | µg/L  | 99% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.916  | µg/L  | 91% 75-125   |              |
| B172708-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMA   |        | 4.634 | 4.697  | µg/L  | 101% 75-125  |              |
| B172708-DUP9 | <b>Duplicate, (1743006-03)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | As(V)                                       | 10.05  |       | 9.662  | µg/L  |              | 4% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMA   | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172708-MS9  | <b>Matrix Spike, (1743006-03)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 52.56  | µg/L  | 105% 75-125  |              |
|              | As(V)                                       | 10.05  | 50.00 | 62.31  | µg/L  | 105% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 53.97  | µg/L  | 106% 75-125  |              |
|              | MMA   | ND     | 50.00 | 53.06  | µg/L  | 106% 75-125  |              |
| B172708-MSD9 | <b>Matrix Spike Duplicate, (1743006-03)</b> |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 53.40  | µg/L  | 107% 75-125  | 2% 25        |
|              | As(V)                                       | 10.05  | 50.00 | 63.43  | µg/L  | 107% 75-125  | 2% 25        |
|              | DMAs  | ND     | 51.00 | 53.87  | µg/L  | 106% 75-125  | 0.2% 25      |
|              | MMA   | ND     | 50.00 | 53.47  | µg/L  | 107% 75-125  | 0.8% 25      |



## Method Blanks & Reporting Limits

**Batch:** B172708  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B172708-BLK1    | 0.00   | µg/L  |                   |
| B172708-BLK2    | 0.00   | µg/L  |                   |
| B172708-BLK3    | 0.00   | µg/L  |                   |
| B172708-BLK4    | 0.00   | µg/L  |                   |
| <b>Average:</b> | 0.000  |       | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | 0.020  |       | <b>MRL:</b> 0.020 |

**Analyte:** As(V)

| Sample          | Result   | Units |                   |
|-----------------|----------|-------|-------------------|
| B172708-BLK1    | -0.00004 | µg/L  |                   |
| B172708-BLK2    | -0.0007  | µg/L  |                   |
| B172708-BLK3    | -0.0005  | µg/L  |                   |
| B172708-BLK4    | -0.003   | µg/L  |                   |
| <b>Average:</b> | -0.001   |       | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | 0.020    |       | <b>MRL:</b> 0.020 |

**Analyte:** DMAs

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B172708-BLK1    | 0.00   | µg/L  |                   |
| B172708-BLK2    | 0.00   | µg/L  |                   |
| B172708-BLK3    | 0.00   | µg/L  |                   |
| B172708-BLK4    | 0.00   | µg/L  |                   |
| <b>Average:</b> | 0.000  |       | <b>MDL:</b> 0.005 |
| <b>Limit:</b>   | 0.021  |       | <b>MRL:</b> 0.021 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172708-BLK1    | 0.00          | µg/L         |                   |
| B172708-BLK2    | 0.00          | µg/L         |                   |
| B172708-BLK3    | 0.00          | µg/L         |                   |
| B172708-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL: 0.023</b> |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1743007-01           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/20/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-6E5-1-102017-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/23/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1743007-02           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/20/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-6F1-2-102017-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/23/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1743007-03           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/20/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-6F2-1-102017-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/23/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1743007-04           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/20/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-5G1-1-102017-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/23/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1743007-05           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/20/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-6G1-1-102017-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/23/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1743007-06            |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/20/2017 |              |           |                    |
|--------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-5C21-2-102017-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/23/2017  |              |           |                    |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                    | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                    | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

| <b>Lab ID:</b> 1743007-07           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/20/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-4C2-1-102017-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/23/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

## Shipping Containers

### Cooler

**Received:** October 23, 2017 15:15  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice (melted)  
**Temperature:** 4.0 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

BAL Report 1743007

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: [Signature] For BAL use only Date: 10/23/17  
Work Order ID: \_\_\_\_\_ Time: 15:15  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection           |                       | Client Sample Info |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |              |  |
|--|----------------------|-----------------------|--------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|--------------|--|
|  | Date                 | Time                  | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |              |  |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID            |                       |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      | Specify Here |  |
|  | 1                    | GW-6E5-1-102017-(20)  | 10/20/2017         | 9:15                 | WATER           | 2                 | 0.45 <sub>um</sub>   | N   |   |   |   |   |  |          |                                      |              |  |
|  | 2                    | GW-6F1-2-102017-(20)  |                    | 10:40                | ↓               | 2                 | ↓  | ↓   |   |   |   |   |  |          |                                      |              |  |
|  | 3                    | GW-6F2-1-102017-(20)  |                    | 11:40                | ↓               | 2                 | ↓  | ↓   |   |   |   |   |  |          |                                      |              |  |
|  | 4                    | GW-5G1-1-102017-(20)  |                    | 12:10                | ↓               | 2                 | ↓  | ↓   |   |   |   |   |  |          |                                      |              |  |
|  | 5                    | GW-6G1-1-102017-(20)  |                    | 12:40                | ↓               | 2                 | ↓  | ↓   |   |   |   |   |  |          |                                      |              |  |
|  | 6                    | GW-5C21-2-102017-(20) |                    | 14:45                | ↓               | 2                 | ↓  | ↓   |   |   |   |   |  |          |                                      |              |  |
|  | 7                    | GW-4C2-1-102017-(20)  |                    | 14:45                | ↓               | 2                 | ↓  | ↓   |   |   |   |   |  |          |                                      |              |  |
|  | 8                    |                       |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |  |
|  | 9                    |                       |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |  |
|  | 10                   |                       |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |  |
|  | Trip Blank (specify) |                       |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |  |

Relinquished By: [Signature] Date: 10/23/17 Time: 15:15 Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Total Number of Packages: \_\_\_\_\_

Page 1 of 1 List Hazardous Contaminants: \_\_\_\_\_ samples@brooksupplied.com | brooksupplied.com

Print



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 30, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On October 24, 2017, Brooks Applied Labs (BAL) received fourteen (14) water samples in acceptable condition. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The client sample GW-7E3-1-102417-(20) was listed on the accompanying chain-of-custody (COC) forms. However, sample GW-7E3-1-102417-(20) was not included with the sample shipment. The client was notified, and BAL was instructed to proceed with the analyses. In accordance with the client's instructions, no results are reported for the client sample GW-7E3-1-102417-(20).

The samples submitted for arsenic speciation analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

#### Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The As(III) RPD for the laboratory duplicate sample B172942-DUP1 was greater than the control limit of 25%, at 34%. The As(III) result for the parent sample, 1743031-05 should be considered estimated due to poor precision, and has been qualified "M" to reflect this discrepancy.

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C). All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Senior Project Manager  
jeremy@brooksapplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                | Lab ID     | Report Matrix | Type         | Sampled    | Received   |
|-----------------------|------------|---------------|--------------|------------|------------|
| GW-7F2-1-102317-(20)  | 1743031-01 | Water         | Sample       | 10/23/2017 | 10/24/2017 |
| GW-7F3-1-102317-(20)  | 1743031-02 | Water         | Sample       | 10/23/2017 | 10/24/2017 |
| GW-7F1-2-102317-(20)  | 1743031-03 | Water         | Sample       | 10/23/2017 | 10/24/2017 |
| GW-7F4-1-102317-(20)  | 1743031-04 | Water         | Sample       | 10/23/2017 | 10/24/2017 |
| GW-7E9-2-102317-(20)  | 1743031-05 | Water         | QC Sample    | 10/23/2017 | 10/24/2017 |
| GW-7E10-1-102317-(20) | 1743031-06 | Water         | Sample       | 10/23/2017 | 10/24/2017 |
| GW-7E4-2-102317-(20)  | 1743031-07 | Water         | Sample       | 10/23/2017 | 10/24/2017 |
| GW-6E12-2-102317-(20) | 1743031-08 | Water         | Sample       | 10/23/2017 | 10/24/2017 |
| EB-102317-(20)        | 1743031-09 | Water         | Equip. Blank | 10/23/2017 | 10/24/2017 |
| GW-7E6-2-102417-(20)  | 1743031-10 | Water         | Sample       | 10/24/2017 | 10/24/2017 |
| GW-7E8-1-102417-(20)  | 1743031-11 | Water         | Sample       | 10/24/2017 | 10/24/2017 |
| GW-7E16-2-102417-(20) | 1743031-12 | Water         | Sample       | 10/24/2017 | 10/24/2017 |
| GW-6E2-1-102417-(20)  | 1743031-13 | Water         | Sample       | 10/24/2017 | 10/24/2017 |
| GW-6E6-1-102417-(20)  | 1743031-14 | Water         | Sample       | 10/24/2017 | 10/24/2017 |

## Batch Summary

| Analyte | Lab Matrix | Method       | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|--------------|------------|------------|---------|----------|
| As(III) | Water      | SOP BAL-4100 | 10/31/2017 | 10/31/2017 | B172942 | 1701346  |
| As(V)   | Water      | SOP BAL-4100 | 10/31/2017 | 10/31/2017 | B172942 | 1701346  |
| DMAs    | Water      | SOP BAL-4100 | 10/31/2017 | 10/31/2017 | B172942 | 1701346  |
| MMAs    | Water      | SOP BAL-4100 | 10/31/2017 | 10/31/2017 | B172942 | 1701346  |





## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-7F2-1-102317-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743031-01                   | As(III) | Water         | D     | 2.47    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-01                   | As(V)   | Water         | D     | 141     |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-01                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-01                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7F3-1-102317-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743031-02                   | As(III) | Water         | D     | 16.9    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-02                   | As(V)   | Water         | D     | 558     |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-02                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-02                   | MMAs    | Water         | D     | 0.361   | J         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7F1-2-102317-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743031-03                   | As(III) | Water         | D     | 11.1    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-03                   | As(V)   | Water         | D     | 2.06    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-03                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-03                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7F4-1-102317-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743031-04                   | As(III) | Water         | D     | 1.11    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-04                   | As(V)   | Water         | D     | 187     |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-04                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-04                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7E9-2-102317-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743031-05                   | As(III) | Water         | D     | 2.72    | M         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-05                   | As(V)   | Water         | D     | 20.2    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-05                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-05                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7E10-1-102317-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743031-06                   | As(III) | Water         | D     | 25.5    | J         | 20.0  | 100  | µg/L | B172942 | 1701346  |
| 1743031-06                   | As(V)   | Water         | D     | 1280    |           | 20.0  | 100  | µg/L | B172942 | 1701346  |
| 1743031-06                   | DMAs    | Water         | D     | ≤ 25.0  | U         | 25.0  | 105  | µg/L | B172942 | 1701346  |
| 1743031-06                   | MMAs    | Water         | D     | ≤ 20.0  | U         | 20.0  | 115  | µg/L | B172942 | 1701346  |





## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-7E4-2-102317-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743031-07                   | As(III) | Water         | D     | 28.7    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-07                   | As(V)   | Water         | D     | 97.2    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-07                   | DMAs    | Water         | D     | 0.333   | J         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-07                   | MMAs    | Water         | D     | 4.82    |           | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-6E12-2-102317-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743031-08                   | As(III) | Water         | D     | 5640    |           | 20.0  | 100  | µg/L | B172942 | 1701346  |
| 1743031-08                   | As(V)   | Water         | D     | 4670    |           | 20.0  | 100  | µg/L | B172942 | 1701346  |
| 1743031-08                   | DMAs    | Water         | D     | ≤ 25.0  | U         | 25.0  | 105  | µg/L | B172942 | 1701346  |
| 1743031-08                   | MMAs    | Water         | D     | 22.9    | J         | 20.0  | 115  | µg/L | B172942 | 1701346  |
| <b>EB-102317-(20)</b>        |         |               |       |         |           |       |      |      |         |          |
| 1743031-09                   | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-09                   | As(V)   | Water         | D     | 0.323   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-09                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-09                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7E6-2-102417-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743031-10                   | As(III) | Water         | D     | 15.9    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-10                   | As(V)   | Water         | D     | 172     |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-10                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-10                   | MMAs    | Water         | D     | 3.19    |           | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7E8-1-102417-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743031-11                   | As(III) | Water         | D     | 116     |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-11                   | As(V)   | Water         | D     | 715     |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743031-11                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743031-11                   | MMAs    | Water         | D     | 0.566   | J         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7E16-2-102417-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743031-12                   | As(III) | Water         | D     | 2130    |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743031-12                   | As(V)   | Water         | D     | 648     |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743031-12                   | DMAs    | Water         | D     | ≤ 5.00  | U         | 5.00  | 21.0 | µg/L | B172942 | 1701346  |
| 1743031-12                   | MMAs    | Water         | D     | ≤ 4.00  | U         | 4.00  | 23.0 | µg/L | B172942 | 1701346  |



## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result | Qualifier | MDL  | MRL | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|--------|-----------|------|-----|------|---------|----------|
| <b>GW-6E2-1-102417-(20)</b> |         |               |       |        |           |      |     |      |         |          |
| 1743031-13                  | As(III) | Water         | D     | 11800  |           | 40.0 | 200 | µg/L | B172942 | 1701346  |
| 1743031-13                  | As(V)   | Water         | D     | 1740   |           | 40.0 | 200 | µg/L | B172942 | 1701346  |
| 1743031-13                  | DMAs    | Water         | D     | ≤ 50.0 | U         | 50.0 | 210 | µg/L | B172942 | 1701346  |
| 1743031-13                  | MMAAs   | Water         | D     | ≤ 40.0 | U         | 40.0 | 230 | µg/L | B172942 | 1701346  |
| <b>GW-6E6-1-102417-(20)</b> |         |               |       |        |           |      |     |      |         |          |
| 1743031-14                  | As(III) | Water         | D     | 93.5   | J         | 40.0 | 200 | µg/L | B172942 | 1701346  |
| 1743031-14                  | As(V)   | Water         | D     | 1280   |           | 40.0 | 200 | µg/L | B172942 | 1701346  |
| 1743031-14                  | DMAs    | Water         | D     | ≤ 50.0 | U         | 50.0 | 210 | µg/L | B172942 | 1701346  |
| 1743031-14                  | MMAAs   | Water         | D     | ≤ 40.0 | U         | 40.0 | 230 | µg/L | B172942 | 1701346  |



## Accuracy & Precision Summary

Batch: B172942  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172942-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.058  | µg/L  | 101% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.588  | µg/L  | 92% 75-125   |              |
|              | DMAAs                                       |        | 3.198 | 2.875  | µg/L  | 90% 75-125   |              |
| B172942-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMAAs                                       |        | 4.634 | 4.693  | µg/L  | 101% 75-125  |              |
| B172942-DUP1 | <b>Duplicate, (1743031-05)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 2.718  |       | 3.836  | µg/L  |              | 34% 25       |
|              | As(V)                                       | 20.18  |       | 19.82  | µg/L  |              | 2% 25        |
|              | DMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172942-MS1  | <b>Matrix Spike, (1743031-05)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 2.718  | 50.00 | 51.64  | µg/L  | 98% 75-125   |              |
|              | As(V)                                       | 20.18  | 50.00 | 69.66  | µg/L  | 99% 75-125   |              |
|              | DMAAs                                       | ND     | 51.00 | 50.60  | µg/L  | 99% 75-125   |              |
|              | MMAAs                                       | ND     | 50.00 | 49.24  | µg/L  | 98% 75-125   |              |
| B172942-MSD1 | <b>Matrix Spike Duplicate, (1743031-05)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 2.718  | 50.00 | 50.29  | µg/L  | 95% 75-125   | 3% 25        |
|              | As(V)                                       | 20.18  | 50.00 | 67.85  | µg/L  | 95% 75-125   | 3% 25        |
|              | DMAAs                                       | ND     | 51.00 | 50.03  | µg/L  | 98% 75-125   | 1% 25        |
|              | MMAAs                                       | ND     | 50.00 | 47.91  | µg/L  | 96% 75-125   | 3% 25        |
| B172942-DUP2 | <b>Duplicate, (1743049-07)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  |       | 20.03  | µg/L  |              | 9% 25        |
|              | As(V)                                       | 59.49  |       | 58.51  | µg/L  |              | 2% 25        |
|              | DMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172942-MS2  | <b>Matrix Spike, (1743049-07)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  | 50.00 | 65.63  | µg/L  | 95% 75-125   |              |
|              | As(V)                                       | 59.49  | 50.00 | 107.4  | µg/L  | 96% 75-125   |              |
|              | DMAAs                                       | ND     | 51.00 | 48.95  | µg/L  | 96% 75-125   |              |
|              | MMAAs                                       | ND     | 50.00 | 47.68  | µg/L  | 95% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743031  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B172942  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172942-MSD2 | <b>Matrix Spike Duplicate, (1743049-07)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  | 50.00 | 73.58  | µg/L  | 111% 75-125  | 11% 25       |
|              | As(V)                                       | 59.49  | 50.00 | 105.3  | µg/L  | 92% 75-125   | 2% 25        |
|              | DMAs  | ND     | 51.00 | 48.57  | µg/L  | 95% 75-125   | 0.8% 25      |
|              | MMAAs                                       | ND     | 50.00 | 46.80  | µg/L  | 94% 75-125   | 2% 25        |



## Method Blanks & Reporting Limits

**Batch:** B172942  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.00         | µg/L  |                   |
| B172942-BLK2    | 0.00         | µg/L  |                   |
| B172942-BLK3    | 0.00         | µg/L  |                   |
| B172942-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.003        | µg/L  |                   |
| B172942-BLK2    | 0.002        | µg/L  |                   |
| B172942-BLK3    | 0.002        | µg/L  |                   |
| B172942-BLK4    | 0.001        | µg/L  |                   |
| <b>Average:</b> | <b>0.002</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** DMAs

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.00         | µg/L  |                   |
| B172942-BLK2    | 0.00         | µg/L  |                   |
| B172942-BLK3    | 0.00         | µg/L  |                   |
| B172942-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743031  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172942-BLK1    | 0.00          | µg/L         |                   |
| B172942-BLK2    | 0.00          | µg/L         |                   |
| B172942-BLK3    | 0.00          | µg/L         |                   |
| B172942-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL:</b> 0.023 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743031  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1743031-01           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/23/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7F2-1-102317-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/24/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |
| B                                   | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |

| <b>Lab ID:</b> 1743031-02           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/23/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7F3-1-102317-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/24/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |
| B                                   | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |

| <b>Lab ID:</b> 1743031-03           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/23/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7F1-2-102317-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/24/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |
| B                                   | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |

| <b>Lab ID:</b> 1743031-04           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/23/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7F4-1-102317-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/24/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |
| B                                   | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743031  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1743031-05           |            | <b>Report Matrix:</b> Water   |         | <b>Collected:</b> 10/23/2017 |       |    |                  |
|-------------------------------------|------------|-------------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7E9-2-102317-(20) |            | <b>Sample Type:</b> QC Sample |         | <b>Received:</b> 10/24/2017  |       |    |                  |
| Des                                 | Container  | Size                          | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                          | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |
| B                                   | EXTRA_VOL  | 6 mL                          | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |

| <b>Lab ID:</b> 1743031-06            |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/23/2017 |       |    |                  |
|--------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7E10-1-102317-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/24/2017  |       |    |                  |
| Des                                  | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                    | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |
| B                                    | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |

| <b>Lab ID:</b> 1743031-07           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/23/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7E4-2-102317-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/24/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |
| B                                   | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |

| <b>Lab ID:</b> 1743031-08            |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/23/2017 |       |    |                  |
|--------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-6E12-2-102317-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/24/2017  |       |    |                  |
| Des                                  | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                    | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |
| B                                    | EXTRA_VOL  | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1743031 |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743031  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1743031-09     |                  | <b>Report Matrix:</b> Water      |            |                     | <b>Collected:</b> 10/23/2017 |           |                    |
|-------------------------------|------------------|----------------------------------|------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> EB-102317-(20) |                  | <b>Sample Type:</b> Equip. Blank |            |                     | <b>Received:</b> 10/24/2017  |           |                    |
| <b>Des</b>                    | <b>Container</b> | <b>Size</b>                      | <b>Lot</b> | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A                             | Vacutainer       | 6 mL                             | 16-0257    | EDTA (PP)           | n/a                          |           | Cooler - 1743031   |
| B                             | EXTRA_VOL        | 6 mL                             | 16-0257    | EDTA (PP)           | n/a                          |           | Cooler - 1743031   |

| <b>Lab ID:</b> 1743031-10           |                  | <b>Report Matrix:</b> Water |            |                     | <b>Collected:</b> 10/24/2017 |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-7E6-2-102417-(20) |                  | <b>Sample Type:</b> Sample  |            |                     | <b>Received:</b> 10/24/2017  |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)           | n/a                          |           | Cooler - 1743031   |
| B                                   | EXTRA_VOL        | 6 mL                        | 16-0257    | EDTA (PP)           | n/a                          |           | Cooler - 1743031   |

| <b>Lab ID:</b> 1743031-11           |                  | <b>Report Matrix:</b> Water |            |                     | <b>Collected:</b> 10/24/2017 |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-7E8-1-102417-(20) |                  | <b>Sample Type:</b> Sample  |            |                     | <b>Received:</b> 10/24/2017  |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)           | n/a                          |           | Cooler - 1743031   |
| B                                   | EXTRA_VOL        | 6 mL                        | 16-0257    | EDTA (PP)           | n/a                          |           | Cooler - 1743031   |

| <b>Lab ID:</b> 1743031-12            |                  | <b>Report Matrix:</b> Water |            |                     | <b>Collected:</b> 10/24/2017 |           |                    |
|--------------------------------------|------------------|-----------------------------|------------|---------------------|------------------------------|-----------|--------------------|
| <b>Sample:</b> GW-7E16-2-102417-(20) |                  | <b>Sample Type:</b> Sample  |            |                     | <b>Received:</b> 10/24/2017  |           |                    |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b> | <b>P-Lot</b>                 | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                    | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)           | n/a                          |           | Cooler - 1743031   |
| B                                    | EXTRA_VOL        | 6 mL                        | 16-0257    | EDTA (PP)           | n/a                          |           | Cooler - 1743031   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743031  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1743031-13           |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/24/2017 |                    |  |
|-------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-6E2-1-102417-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/24/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler - 1743031   |  |
| B                                   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler - 1743031   |  |

| <b>Lab ID:</b> 1743031-14           |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/24/2017 |                    |  |
|-------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-6E6-1-102417-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/24/2017  |                    |  |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                   | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler - 1743031   |  |
| B                                   | EXTRA_VOL        | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler - 1743031   |  |

## Shipping Containers

### Cooler - 1743031

**Received:** October 24, 2017 14:30  
**Tracking No:** n/a via Courier  
**Coolant Type:** Ice  
**Temperature:** 4.2 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#8

**Custody seals present?** Yes  
**Custody seals intact?** Yes  
**COC present?** Yes



# Chain-of-Custody Form

BAL Report 1743031

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: SBL For BAL use only Date: 10/24/17

Work Order ID: 1743031 Time: 14:30

Project ID: \_\_\_\_\_

Mail Invoice to:  
Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to:  
Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

| Requested TAT<br>(business days)   | Collection                              |                   | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   | Comments |  |
|--|---|-------------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|----------|--|
|  | Date                                    | Time              | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 |          | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                   |                           |                      |                 |                   |  |   |   |   |   |   |          |  |
| Sample ID  |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |          | Specify Here   |
| 1  | GW-7F2-1-102317-(20)                    | 10-23-17 9:25     | Water                     | 2                    | Y               | N                 |  |   |   |   |   | X   |          | 2MS  |
| 2  | GW-7F3-1-102317-(20)                    | 9:30              |                           |                      |                 |                   |  |   |   |   |   |   |          | 45MS   |
| 3  | GW-7F1-2-102317-(20)                    | 10:45             |                           |                      |                 |                   |  |   |   |   |   |   |          | 25MS   |
| 4  | GW-7F4-1-102317-(20)                    | 1145              |                           |                      |                 |                   |  |   |   |   |   |   |          | 5MS  |
| 5  | GW-7E9-2-102317-(20)                    | 1200              |                           |                      |                 |                   |  |   |   |   |   |   |          | 50MS   |
| 6  | GW-7E10-1-102317-(20)                   | 1300              |                           |                      |                 |                   |  |   |   |   |   |   |          | 13MS   |
| 7  | GW-7E4-2-102317-(20)                    | 1315              |                           |                      |                 |                   |  |   |   |   |   |   |          | 13MS   |
| 8  | GW-6E7-2-102317-(20)                    | 1400              |                           |                      |                 |                   |  |   |   |   |   |   |          | 38MS   |
| 9  | EB-102317-(20)                          | 1405              |                           |                      |                 |                   |  |   |   |   |   |   |          |  |
| 10   | GW-7E6-2-102417-(20)                    | 10-24-17 8:55     |                           |                      |                 |                   |  |   |   |   |   |   |          | 9MS  |
| Trip Blank (specify)   |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |          |  |
| Relinquished By: <u>feal pm</u>  | Date: <u>10-24-17</u>                   | Time: <u>1300</u> | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |          |  |
| Received By:   | Date:                                   | Time:             | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |          |  |

Print



# Chain-of-Custody Form

BAL Report 1743031

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: SPC For BAL use only Date: 10/24/17

Work Order ID: \_\_\_\_\_ Time: 14:30

Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection           |                       | Client Sample Info |                      |                           |                   | BRL Analyses Required  |   |   |   |   |   | Comments |  |                                      |
|--|----------------------|-----------------------|--------------------|----------------------|---------------------------|-------------------|--|---|---|---|---|---|----------|--|--------------------------------------|
|  | Date                 | Time                  | Matrix Type        | Number of Containers | Field Filtered?           | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 |          | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID            |                       |                    |                      |                           |                   |  |   |   |   |   |   |          |  |                                      |
|  | 1                    | GW-7EB-1-102417-(20)  | 10-24-17           | 9:00                 | Water                     | 2                 | Y  | N   |   |   |   | X   |          |  | 18MS                                 |
|  | 2                    | GW-7E16-2-102417-(20) |                    | 10:00                |                           |                   |  |   |   |   |   |   |          |  | 3MS                                  |
|  | 3                    | GW-6E2-1-102417-(20)  |                    | 10:05                |                           |                   |  |   |   |   |   |   |          |  | 7MS                                  |
|  | 4                    | GW-6E6-1-102417-(20)  |                    | 11:00                |                           |                   |  |   |   |   |   |   |          |  | 12MS                                 |
|  | 5                    | GW-7E3-1-102417-(20)  |                    | 11:05                |                           |                   |  |   |   |   |   |   |          |  | 11MS                                 |
|  | 6                    |                       |                    |                      |                           |                   |  |   |   |   |   |   |          |  |                                      |
|  | 7                    |                       |                    |                      |                           |                   |  |   |   |   |   |   |          |  |                                      |
|  | 8                    |                       |                    |                      |                           |                   |  |   |   |   |   |   |          |  |                                      |
|  | 9                    |                       |                    |                      |                           |                   |  |   |   |   |   |   |          |  |                                      |
|  | 10                   |                       |                    |                      |                           |                   |  |   |   |   |   |   |          |  |                                      |
|  | Trip Blank (specify) |                       |                    |                      |                           |                   |  |   |   |   |   |   |          |  |                                      |
| Relinquished By: <u>[Signature]</u>  |                      | Date: <u>10-24-17</u> | Time: <u>1300</u>  |                      | Relinquished By:          |                   |  | Date:   | Time:   |   |   |   |          |  |                                      |
| Received By:   |                      | Date:                 | Time:              |                      | Total Number of Packages: |                   |  |   |   |   |   |   |          |  |                                      |





18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 30, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Revision 1: The sample ID for the client sample 1743049-14 was incorrectly transcribed in the initial report issued on November 16, 2017. In this revised report, the client sample ID for 1743049-14 was corrected (from **GW-BF1-1R-102517-(20)** to **GW-8F1-1R-102517-(20)**), as requested by the client. No other changes were made with respect to the original report.

Mr. Troy Bussey,

On October 26, 2017, Brooks Applied Labs (BAL) received fifteen (15) water samples in acceptable condition. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The samples submitted for arsenic speciation analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

#### *Arsenic Speciation Analysis by IC-ICP-CRC-MS*

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

If the native sample result and/or the DUP result is not detected (ND) above the MDL, then the associated RPD is not calculated (N/C). Instances where the matrix spike/matrix spike duplicate (MS/MSD) sets were spiked at a concentration less than 25% of the native sample result, the recoveries were not reported (NR). Spike recoveries are not a valid indicator of data quality when the analyte concentration in the source sample is greater than the spiking level.

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish extending to the right.

Jeremy Maute  
Senior Project Manager  
jeremy@brooksapplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                       | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|------------------------------|------------|---------------|--------|------------|------------|
| GW-7E3-1-102417-(20)         | 1743049-01 | Water         | Sample | 10/24/2017 | 10/26/2017 |
| GW-6B19-2-102417-(20)        | 1743049-02 | Water         | Sample | 10/24/2017 | 10/26/2017 |
| GW-6B19-2-102417-(21)        | 1743049-03 | Water         | Sample | 10/24/2017 | 10/26/2017 |
| GW-6D25-2-102417-(20)        | 1743049-04 | Water         | Sample | 10/24/2017 | 10/26/2017 |
| GW-6G3-2-102517-(20)         | 1743049-05 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-6H1-1-102517-(20)         | 1743049-06 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-7E13-2R-102517-(20)       | 1743049-07 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-6D14-1-102517-(20)        | 1743049-08 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-6E1-1-102517-(20)         | 1743049-09 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-6E9-2-102517-(20)         | 1743049-10 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-5D2-1R-102517-(20)        | 1743049-11 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-6D25-1-102517-(20)        | 1743049-12 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-7E7-2-102517-(20)         | 1743049-13 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-8F1-1R-102517-(20)        | 1743049-14 | Water         | Sample | 10/25/2017 | 10/26/2017 |
| GW-1B4-1-102617-2.9-7.9-(20) | 1743049-15 | Water         | Sample | 10/26/2017 | 10/26/2017 |

## Batch Summary

| Analyte | Lab Matrix | Method       | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|--------------|------------|------------|---------|----------|
| As(III) | Water      | SOP BAL-4100 | 10/31/2017 | 11/01/2017 | B172942 | 1701346  |
| As(V)   | Water      | SOP BAL-4100 | 10/31/2017 | 11/01/2017 | B172942 | 1701346  |
| DMAs    | Water      | SOP BAL-4100 | 10/31/2017 | 11/01/2017 | B172942 | 1701346  |
| MMAs    | Water      | SOP BAL-4100 | 10/31/2017 | 11/01/2017 | B172942 | 1701346  |





## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-7E3-1-102417-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743049-01                   | As(III) | Water         | D     | 12100   |           | 40.0  | 200  | µg/L | B172942 | 1701346  |
| 1743049-01                   | As(V)   | Water         | D     | 349     |           | 40.0  | 200  | µg/L | B172942 | 1701346  |
| 1743049-01                   | DMAs    | Water         | D     | ≤ 50.0  | U         | 50.0  | 210  | µg/L | B172942 | 1701346  |
| 1743049-01                   | MMAAs   | Water         | D     | ≤ 40.0  | U         | 40.0  | 230  | µg/L | B172942 | 1701346  |
| <b>GW-6B19-2-102417-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743049-02                   | As(III) | Water         | D     | 2350    |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-02                   | As(V)   | Water         | D     | 445     |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-02                   | DMAs    | Water         | D     | ≤ 5.00  | U         | 5.00  | 21.0 | µg/L | B172942 | 1701346  |
| 1743049-02                   | MMAAs   | Water         | D     | ≤ 4.00  | U         | 4.00  | 23.0 | µg/L | B172942 | 1701346  |
| <b>GW-6B19-2-102417-(21)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743049-03                   | As(III) | Water         | D     | 2480    |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-03                   | As(V)   | Water         | D     | 939     |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-03                   | DMAs    | Water         | D     | ≤ 5.00  | U         | 5.00  | 21.0 | µg/L | B172942 | 1701346  |
| 1743049-03                   | MMAAs   | Water         | D     | ≤ 4.00  | U         | 4.00  | 23.0 | µg/L | B172942 | 1701346  |
| <b>GW-6D25-2-102417-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743049-04                   | As(III) | Water         | D     | 2600    |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-04                   | As(V)   | Water         | D     | 2760    |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-04                   | DMAs    | Water         | D     | ≤ 5.00  | U         | 5.00  | 21.0 | µg/L | B172942 | 1701346  |
| 1743049-04                   | MMAAs   | Water         | D     | ≤ 4.00  | U         | 4.00  | 23.0 | µg/L | B172942 | 1701346  |
| <b>GW-6G3-2-102517-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743049-05                   | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-05                   | As(V)   | Water         | D     | 0.400   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-05                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743049-05                   | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-6H1-1-102517-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743049-06                   | As(III) | Water         | D     | 244     |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-06                   | As(V)   | Water         | D     | 86.8    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-06                   | DMAs    | Water         | D     | 0.677   | J         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743049-06                   | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |



## Sample Results

| Sample                        | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|-------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-7E13-2R-102517-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743049-07                    | As(III) | Water         | D     | 18.3    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-07                    | As(V)   | Water         | D     | 59.5    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-07                    | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743049-07                    | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-6D14-1-102517-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743049-08                    | As(III) | Water         | D     | 30900   |           | 40.0  | 200  | µg/L | B172942 | 1701346  |
| 1743049-08                    | As(V)   | Water         | D     | 17800   |           | 40.0  | 200  | µg/L | B172942 | 1701346  |
| 1743049-08                    | DMAs    | Water         | D     | ≤ 50.0  | U         | 50.0  | 210  | µg/L | B172942 | 1701346  |
| 1743049-08                    | MMAs    | Water         | D     | ≤ 40.0  | U         | 40.0  | 230  | µg/L | B172942 | 1701346  |
| <b>GW-6E1-1-102517-(20)</b>   |         |               |       |         |           |       |      |      |         |          |
| 1743049-09                    | As(III) | Water         | D     | 27200   |           | 80.0  | 400  | µg/L | B172942 | 1701346  |
| 1743049-09                    | As(V)   | Water         | D     | 11100   |           | 80.0  | 400  | µg/L | B172942 | 1701346  |
| 1743049-09                    | DMAs    | Water         | D     | ≤ 100   | U         | 100   | 420  | µg/L | B172942 | 1701346  |
| 1743049-09                    | MMAs    | Water         | D     | ≤ 80.0  | U         | 80.0  | 460  | µg/L | B172942 | 1701346  |
| <b>GW-6E9-2-102517-(20)</b>   |         |               |       |         |           |       |      |      |         |          |
| 1743049-10                    | As(III) | Water         | D     | 2160    |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-10                    | As(V)   | Water         | D     | 571     |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-10                    | DMAs    | Water         | D     | ≤ 5.00  | U         | 5.00  | 21.0 | µg/L | B172942 | 1701346  |
| 1743049-10                    | MMAs    | Water         | D     | ≤ 4.00  | U         | 4.00  | 23.0 | µg/L | B172942 | 1701346  |
| <b>GW-5D2-1R-102517-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743049-11                    | As(III) | Water         | D     | 15.4    | J         | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-11                    | As(V)   | Water         | D     | 2240    |           | 4.00  | 20.0 | µg/L | B172942 | 1701346  |
| 1743049-11                    | DMAs    | Water         | D     | ≤ 5.00  | U         | 5.00  | 21.0 | µg/L | B172942 | 1701346  |
| 1743049-11                    | MMAs    | Water         | D     | 8.39    | J         | 4.00  | 23.0 | µg/L | B172942 | 1701346  |
| <b>GW-6D25-1-102517-(20)</b>  |         |               |       |         |           |       |      |      |         |          |
| 1743049-12                    | As(III) | Water         | D     | 4810    |           | 20.0  | 100  | µg/L | B172942 | 1701346  |
| 1743049-12                    | As(V)   | Water         | D     | 375     |           | 20.0  | 100  | µg/L | B172942 | 1701346  |
| 1743049-12                    | DMAs    | Water         | D     | ≤ 25.0  | U         | 25.0  | 105  | µg/L | B172942 | 1701346  |
| 1743049-12                    | MMAs    | Water         | D     | ≤ 20.0  | U         | 20.0  | 115  | µg/L | B172942 | 1701346  |



## Sample Results

| Sample                              | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|-------------------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-7E7-2-102517-(20)</b>         |         |               |       |         |           |       |      |      |         |          |
| 1743049-13                          | As(III) | Water         | D     | 9.94    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-13                          | As(V)   | Water         | D     | 8.43    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-13                          | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743049-13                          | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-8F1-1R-102517-(20)</b>        |         |               |       |         |           |       |      |      |         |          |
| 1743049-14                          | As(III) | Water         | D     | 0.858   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-14                          | As(V)   | Water         | D     | 6.33    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-14                          | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743049-14                          | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-1B4-1-102617-2.9-7.9-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1743049-15                          | As(III) | Water         | D     | 15.2    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-15                          | As(V)   | Water         | D     | 41.6    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1743049-15                          | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1743049-15                          | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |



## Accuracy & Precision Summary

Batch: B172942  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172942-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.058  | µg/L  | 101% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.588  | µg/L  | 92% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.875  | µg/L  | 90% 75-125   |              |
| B172942-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMA   |        | 4.634 | 4.693  | µg/L  | 101% 75-125  |              |
| B172942-DUP2 | <b>Duplicate, (1743049-07)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  |       | 20.03  | µg/L  |              | 9% 25        |
|              | As(V)                                       | 59.49  |       | 58.51  | µg/L  |              | 2% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMA   | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172942-MS2  | <b>Matrix Spike, (1743049-07)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  | 50.00 | 65.63  | µg/L  | 95% 75-125   |              |
|              | As(V)                                       | 59.49  | 50.00 | 107.4  | µg/L  | 96% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 48.95  | µg/L  | 96% 75-125   |              |
|              | MMA   | ND     | 50.00 | 47.68  | µg/L  | 95% 75-125   |              |
| B172942-MSD2 | <b>Matrix Spike Duplicate, (1743049-07)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 18.29  | 50.00 | 73.58  | µg/L  | 111% 75-125  | 11% 25       |
|              | As(V)                                       | 59.49  | 50.00 | 105.3  | µg/L  | 92% 75-125   | 2% 25        |
|              | DMAs  | ND     | 51.00 | 48.57  | µg/L  | 95% 75-125   | 0.8% 25      |
|              | MMA   | ND     | 50.00 | 46.80  | µg/L  | 94% 75-125   | 2% 25        |



## Method Blanks & Reporting Limits

**Batch:** B172942  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.00         | µg/L  |                   |
| B172942-BLK2    | 0.00         | µg/L  |                   |
| B172942-BLK3    | 0.00         | µg/L  |                   |
| B172942-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.003        | µg/L  |                   |
| B172942-BLK2    | 0.002        | µg/L  |                   |
| B172942-BLK3    | 0.002        | µg/L  |                   |
| B172942-BLK4    | 0.001        | µg/L  |                   |
| <b>Average:</b> | <b>0.002</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** DMAs

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.00         | µg/L  |                   |
| B172942-BLK2    | 0.00         | µg/L  |                   |
| B172942-BLK3    | 0.00         | µg/L  |                   |
| B172942-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743049 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172942-BLK1    | 0.00          | µg/L         |                   |
| B172942-BLK2    | 0.00          | µg/L         |                   |
| B172942-BLK3    | 0.00          | µg/L         |                   |
| B172942-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL:</b> 0.023 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743049 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|                                     |                  |                             |            |                              |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1743049-01           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/24/2017 |              |           |                    |
| <b>Sample:</b> GW-7E3-1-102417-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/26/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

|                                      |                  |                             |            |                              |              |           |                    |
|--------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1743049-02            |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/24/2017 |              |           |                    |
| <b>Sample:</b> GW-6B19-2-102417-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/26/2017  |              |           |                    |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                    | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                    | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

|                                      |                  |                             |            |                              |              |           |                    |
|--------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1743049-03            |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/24/2017 |              |           |                    |
| <b>Sample:</b> GW-6B19-2-102417-(21) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/26/2017  |              |           |                    |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                    | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                    | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

|                                      |                  |                             |            |                              |              |           |                    |
|--------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1743049-04            |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/24/2017 |              |           |                    |
| <b>Sample:</b> GW-6D25-2-102417-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/26/2017  |              |           |                    |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                    | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                    | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

|                                     |                  |                             |            |                              |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1743049-05           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/25/2017 |              |           |                    |
| <b>Sample:</b> GW-6G3-2-102517-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/26/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler             |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743049 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|                                       |                  |             |                             |                     |              |                              |                    |  |
|---------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|--|
| <b>Lab ID:</b> 1743049-06             |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/25/2017 |                    |  |
| <b>Sample:</b> GW-6H1-1-102517-(20)   |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/26/2017  |                    |  |
| <b>Des</b>                            | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                     | Vacutainer       | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                     | EXTRA_VOL        | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| <b>Lab ID:</b> 1743049-07             |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/25/2017 |                    |  |
| <b>Sample:</b> GW-7E13-2R-102517-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/26/2017  |                    |  |
| <b>Des</b>                            | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                     | Vacutainer       | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                     | EXTRA_VOL        | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| <b>Lab ID:</b> 1743049-08             |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/25/2017 |                    |  |
| <b>Sample:</b> GW-6D14-1-102517-(20)  |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/26/2017  |                    |  |
| <b>Des</b>                            | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                     | Vacutainer       | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                     | EXTRA_VOL        | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| <b>Lab ID:</b> 1743049-09             |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/25/2017 |                    |  |
| <b>Sample:</b> GW-6E1-1-102517-(20)   |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/26/2017  |                    |  |
| <b>Des</b>                            | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                     | Vacutainer       | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                     | EXTRA_VOL        | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| <b>Lab ID:</b> 1743049-10             |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/25/2017 |                    |  |
| <b>Sample:</b> GW-6E9-2-102517-(20)   |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/26/2017  |                    |  |
| <b>Des</b>                            | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                     | Vacutainer       | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |
| B                                     | EXTRA_VOL        | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler             |  |



Project ID: PTC-OA1701  
PM: Jeremy Maute



BAL Report 1743049 Rev 1  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1743049-11            |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/25/2017 |    |             |
|--------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-5D2-1R-102517-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/26/2017  |    |             |
| Des                                  | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                    | Vacutainer | 6mL  | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                    | EXTRA_VOL  | 6mL  | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1743049-12            |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/25/2017 |    |             |
|--------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-6D25-1-102517-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/26/2017  |    |             |
| Des                                  | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                    | Vacutainer | 6mL  | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                    | EXTRA_VOL  | 6mL  | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1743049-13           |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/25/2017 |    |             |
|-------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-7E7-2-102517-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/26/2017  |    |             |
| Des                                 | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                   | Vacutainer | 6mL  | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                   | EXTRA_VOL  | 6mL  | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1743049-14            |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/25/2017 |    |             |
|--------------------------------------|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-8F1-1R-102517-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/26/2017  |    |             |
| Des                                  | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A                                    | Vacutainer | 6mL  | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B                                    | EXTRA_VOL  | 6mL  | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

| <b>Lab ID:</b> 1743049-15                   |            |      | <b>Report Matrix:</b> Water |              | <b>Collected:</b> 10/26/2017 |    |             |
|---|------------|------|-----------------------------|--------------|------------------------------|----|-------------|
| <b>Sample:</b> GW-1B4-1-102617-2.9-7.9-(20) |            |      | <b>Sample Type:</b> Sample  |              | <b>Received:</b> 10/26/2017  |    |             |
| Des   | Container  | Size | Lot                         | Preservation | P-Lot                        | pH | Ship. Cont. |
| A   | Vacutainer | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |
| B   | EXTRA_VOL  | 6 mL | 16-0257                     | EDTA (PP)    | n/a                          |    | Cooler      |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1743049 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### Cooler

**Received:** October 26, 2017 15:00  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 5.5 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#10

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

Received by: Heather For BAL use only Date: 10/26/17  
 Work Order ID: \_\_\_\_\_ Time: 15:00  
 Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)   | Collection            |                        | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|-----------------------|------------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                  | Time                   | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6920 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID             |                        |                                 |                      |                 |                   |  |   |   |   |   |   |  |          | Specify Here                         |
|   | 1                     | GW-7E3-1-102417-(20)   | 10-24-17                        | 1105                 | Water           | 2                 | Y  | N   |   |   |   |   |  | X        | 11MS                                 |
|   | 2                     | GW-6B19-2-102417-(20)  | ↓                               | 1235                 | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 11MS                                 |
|   | 3                     | GW-6B19-2-102417-(21)  | ↓                               | 1240                 | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 11MS                                 |
|   | 4                     | GW-6D25-2-102417-(20)  | ↓                               | 1440                 | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 5MS                                  |
|   | 5                     | GW-6G3-2-102517-(20)   | 10-25-17                        | 840                  | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 18MS                                 |
|   | 6                     | GW-6H1-1-102517-(20)   | ↓                               | 835                  | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 20MS                                 |
|   | 7                     | GW-7E13-2R-102517-(20) | ↓                               | 1015                 | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 4MS                                  |
|   | 8                     | GW-6D14-1-102517-(20)  | ↓                               | 1025                 | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 15MS                                 |
|   | 9                     | GW-6E1-1-102517-(20)   | ↓                               | 1120                 | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 2MS                                  |
|   | 10                    | GW-6E9-2-102517-(20)   | ↓                               | 1130                 | ↓               | ↓                 | ↓  | ↓   |   |   |   |   |  |          | 15MS                                 |
|   | Trip Blank (specify)  |                        |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>LF</u>  | Date: <u>10/26/17</u> | Time: <u>1500</u>      | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |                                      |
| Received By: _____  | Date: _____           | Time: _____            | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |

Print



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Mu For BAL use only Date: 10/26/17

Work Order ID: \_\_\_\_\_ Time: 15:00

Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837

Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection           |                           | Client Sample Info |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|----------------------|---------------------------|--------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                 | Time                      | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6920 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID            |                           |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|  | 1                    | GW-5D2-1R-102517-(20)     | 10-25-17           | 1235                 | water           | 2                 | Y  | N   |   |   |   | X   |  |          | 6 MS                                 |
|  | 2                    | GW-6D25-1-102517-(20)     |                    | 1240                 |                 |                   |  |   |   |   |   |   |  |          | 2 MS                                 |
|  | 3                    | GW-7E7-2-10297-(20)       |                    | 1415                 |                 |                   |  |   |   |   |   |   |  |          | 2 MS                                 |
|  | 4                    | GW-8F1-1R-102517-(20)     |                    | 1420                 |                 |                   |  |   |   |   |   |   |  |          | 2 MS                                 |
|  | 5                    | GW-1B4-1-102617-2979-(20) | 10-26-17           | 1145                 |                 |                   |  |   |   |   |   |   |  |          | 0.8 MS                               |
|  | 6                    |                           |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|  | 7                    |                           |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|  | 8                    |                           |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|  | 9                    |                           |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|  | 10                   |                           |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|  | Trip Blank (specify) |                           |                    |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |

|                            |                       |                   |                           |       |       |
|----------------------------|-----------------------|-------------------|---------------------------|-------|-------|
| Relinquished By: <u>Lh</u> | Date: <u>10/26/17</u> | Time: <u>1500</u> | Relinquished By:          | Date: | Time: |
| Received By:               | Date:                 | Time:             | Total Number of Packages: |       |       |

Print





18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

December 21, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On October 30, 2017, Brooks Applied Labs (BAL) received eleven (11) water samples in a sealed container with a temperature of 2.0°C. The samples were logged-in for the total recoverable and dissolved metals (aluminum [Al], arsenic [As], calcium [Ca], iron [Fe], potassium [K], magnesium [Mg], manganese [Mg], sodium [Na], and silicon [Si]) analyses via digestion and subsequent analysis by modified EPA Method 1638. The samples were logged in for total recoverable and dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. The samples were logged-in for the total mercury [Hg] analysis by EPA Method 1631E. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The samples submitted for arsenic speciation and dissolved analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

*Total Recoverable and Dissolved Metals (Al, As, Ca, Fe, K, Mg, Mn, Na, and Si) Analysis by EPA Method 1638, Mod.*

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Total recoverable and dissolved metals (Al, As, Ca, Fe, K, Mg, Mn, Na, and Si) quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

**Batch B173242**

The sodium spike recoveries for the blank spike samples (B173242-BS1 and B173242-BS2) were greater than the upper control limit of 130% (at 170% and 171%, respectively). The blank spike samples were created at the prep step, prior to the in-bottle oven digest. A certified reference material (B173242-SRM1)

was analyzed in the analytical run. The reference material recovery for total sodium was acceptable at 98%, demonstrating that the analytical method stabilizes sodium in solution. Due to high sodium levels in the source samples, sodium was underspiked in the matrix spike and matrix spike duplicate (MS/MSD) samples. Due to the elevated sodium recoveries in B173242-BS1 and B173242-BS2, all sodium results in this batch are qualified as estimated "J-1" due to a potential high bias.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. BAL requires that the MRL is at least 2 times the value of the corresponding MDL. Due to an elevated MDL, it was necessary to raise the Na MRL to 2 times the value of the MDL. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Total Recoverable metals (Cu, Ni, and Pb) Analysis by EPA Method 1640, Mod.

Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid (HNO<sub>3</sub>) and then prepared according to EPA Method 1640. All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). The ICP-DRC-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

### **Batch B173101**

The trace metals fractions designated for Column Chelation (EPA Method 1640) analyses arrived in high-density polyethylene (HDPE) bottles that were not lot tested down to levels adjusted to EPA Method 1640 levels, which yield lower MDLs/MRLs compared to EPA Method 1638 analyses. These fractions were collected in HDPE bottles cleaned and lot tested for EPA Method 1638 analyses.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Total and Dissolved Mercury Quantitation by EPA Method 1631E

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold

amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

### **Batch B172993**

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

### *Arsenic Speciation Analysis by IC-ICP-CRC-MS*

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

### **Batch B172942**

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,



Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksupplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.





## Sample Information

| Sample                  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|-------------------------|------------|---------------|--------|------------|------------|
| GW-7I1-1-102717-(20)    | 1744007-01 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-7I1-1-102717-(21)    | 1744007-02 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-7I3-2-102717-(20)    | 1744007-03 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-8H1-1-102717-(20)    | 1744007-04 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-7G1-1-102717-(20)    | 1744007-05 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-7G1-2-102717-(20)    | 1744007-06 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-8G2-1-102717-(20)    | 1744007-07 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-8G3-2-102717-(20)    | 1744007-08 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-8F2-2R-102717-(20)   | 1744007-09 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-131+00-1-102717      | 1744007-10 | Water         | Sample | 10/27/2017 | 10/30/2017 |
| GW-131+00-1-102717-(20) | 1744007-11 | Water         | Sample | 10/27/2017 | 10/30/2017 |

## Batch Summary

| Analyte | Lab Matrix | Method          | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|-----------------|------------|------------|---------|----------|
| Al      | Water      | EPA 1638 Mod    | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| As      | Water      | EPA 1638 Mod    | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| As(III) | Water      | SOP BAL-4100    | 10/31/2017 | 11/01/2017 | B172942 | 1701346  |
| As(V)   | Water      | SOP BAL-4100    | 10/31/2017 | 11/01/2017 | B172942 | 1701346  |
| Ca      | Water      | EPA 1638 Mod    | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Cu      | Water      | EPA 1640 Column | 11/03/2017 | 11/16/2017 | B173101 | 1701419  |
| DMAs    | Water      | SOP BAL-4100    | 10/31/2017 | 11/01/2017 | B172942 | 1701346  |
| Fe      | Water      | EPA 1638 Mod    | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Hg      | Water      | EPA 1631 E      | 11/03/2017 | 11/06/2017 | B172993 | 1701378  |
| K       | Water      | EPA 1638 Mod    | 11/03/2017 | 12/14/2017 | B173242 | 1701552  |
| Mg      | Water      | EPA 1638 Mod    | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| MMAs    | Water      | SOP BAL-4100    | 10/31/2017 | 11/01/2017 | B172942 | 1701346  |
| Mn      | Water      | EPA 1638 Mod    | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Na      | Water      | EPA 1638 Mod    | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Ni      | Water      | EPA 1640 Column | 11/03/2017 | 11/16/2017 | B173101 | 1701419  |
| Pb      | Water      | EPA 1640 Column | 11/03/2017 | 11/16/2017 | B173101 | 1701419  |
| Si      | Water      | EPA 1638 Mod    | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |



## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-711-1-102717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744007-01                  | As(III) | Water         | D     | 0.315   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-01                  | As(V)   | Water         | D     | 0.733   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-01                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1744007-01                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-711-1-102717-(21)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744007-02                  | As(III) | Water         | D     | 0.649   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-02                  | As(V)   | Water         | D     | 0.925   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-02                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1744007-02                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-713-2-102717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744007-03                  | As(III) | Water         | D     | 0.911   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-03                  | As(V)   | Water         | D     | 0.852   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-03                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1744007-03                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-8H1-1-102717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744007-04                  | As(III) | Water         | D     | 5.46    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-04                  | As(V)   | Water         | D     | 3.63    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-04                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1744007-04                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7G1-1-102717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744007-05                  | As(III) | Water         | D     | 10.5    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-05                  | As(V)   | Water         | D     | 2.75    |           | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-05                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1744007-05                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |
| <b>GW-7G1-2-102717-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744007-06                  | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-06                  | As(V)   | Water         | D     | 0.371   | J         | 0.200 | 1.00 | µg/L | B172942 | 1701346  |
| 1744007-06                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B172942 | 1701346  |
| 1744007-06                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B172942 | 1701346  |



## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-8G2-1-102717-(20)</b>  |         |               |       |         |           |       |       |      |         |          |
| 1744007-07                   | As(III) | Water         | D     | 7.73    |           | 0.200 | 1.00  | µg/L | B172942 | 1701346  |
| 1744007-07                   | As(V)   | Water         | D     | 152     |           | 0.200 | 1.00  | µg/L | B172942 | 1701346  |
| 1744007-07                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172942 | 1701346  |
| 1744007-07                   | MMAAs   | Water         | D     | 0.241   | J         | 0.200 | 1.15  | µg/L | B172942 | 1701346  |
| <b>GW-8G3-2-102717-(20)</b>  |         |               |       |         |           |       |       |      |         |          |
| 1744007-08                   | As(III) | Water         | D     | 6.55    |           | 0.200 | 1.00  | µg/L | B172942 | 1701346  |
| 1744007-08                   | As(V)   | Water         | D     | 0.421   | J         | 0.200 | 1.00  | µg/L | B172942 | 1701346  |
| 1744007-08                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172942 | 1701346  |
| 1744007-08                   | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172942 | 1701346  |
| <b>GW-8F2-2R-102717-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744007-09                   | As(III) | Water         | D     | 2.84    |           | 0.200 | 1.00  | µg/L | B172942 | 1701346  |
| 1744007-09                   | As(V)   | Water         | D     | 1.82    |           | 0.200 | 1.00  | µg/L | B172942 | 1701346  |
| 1744007-09                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172942 | 1701346  |
| 1744007-09                   | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172942 | 1701346  |
| <b>GW-131+00-1-102717</b>    |         |               |       |         |           |       |       |      |         |          |
| 1744007-10                   | As      | Water         | TR    | 1.46    | J         | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744007-10                   | Cu      | Water         | TR    | 2.68    |           | 0.303 | 0.909 | µg/L | B173101 | 1701419  |
| 1744007-10                   | Hg      | Water         | TR    | 0.86    |           | 0.10  | 0.41  | ng/L | B172993 | 1701378  |
| 1744007-10                   | Ni      | Water         | TR    | 1.82    |           | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1744007-10                   | Pb      | Water         | TR    | 0.225   | J         | 0.101 | 0.303 | µg/L | B173101 | 1701419  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-131+00-1-102717-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744007-11                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744007-11                     | As      | Water         | D     | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744007-11                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B172942 | 1701346  |
| 1744007-11                     | As(V)   | Water         | D     | 0.325   | J         | 0.200 | 1.00  | µg/L | B172942 | 1701346  |
| 1744007-11                     | Ca      | Water         | D     | 118000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744007-11                     | Cu      | Water         | D     | ≤ 0.303 | U         | 0.303 | 0.909 | µg/L | B173101 | 1701419  |
| 1744007-11                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B172942 | 1701346  |
| 1744007-11                     | Fe      | Water         | D     | 884     |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744007-11                     | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744007-11                     | K       | Water         | D     | 28400   |           | 245   | 1020  | µg/L | B173242 | 1701552  |
| 1744007-11                     | Mg      | Water         | D     | 126000  |           | 22.0  | 69.4  | µg/L | B173242 | 1701504  |
| 1744007-11                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B172942 | 1701346  |
| 1744007-11                     | Mn      | Water         | D     | 128     |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744007-11                     | Na      | Water         | D     | 302000  | J-1       | 30.2  | 60.0  | µg/L | B173242 | 1701504  |
| 1744007-11                     | Ni      | Water         | D     | 0.296   | J         | 0.141 | 0.606 | µg/L | B173101 | 1701419  |
| 1744007-11                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173101 | 1701419  |
| 1744007-11                     | Si      | Water         | D     | 23100   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |



## Accuracy & Precision Summary

Batch: B172942  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B172942-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.058  | µg/L  | 101% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 4.588  | µg/L  | 92% 75-125   |              |
|              | DMAs  |        | 3.198 | 2.875  | µg/L  | 90% 75-125   |              |
| B172942-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMAAs                                       |        | 4.634 | 4.693  | µg/L  | 101% 75-125  |              |
| B172942-DUP3 | <b>Duplicate, (1744007-01)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 0.315  |       | 0.336  | µg/L  |              | 6% 25        |
|              | As(V)                                       | 0.733  |       | 0.693  | µg/L  |              | 6% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172942-MS3  | <b>Matrix Spike, (1744007-01)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 0.315  | 50.00 | 48.54  | µg/L  | 96% 75-125   |              |
|              | As(V)                                       | 0.733  | 50.00 | 48.96  | µg/L  | 96% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 49.88  | µg/L  | 98% 75-125   |              |
|              | MMAAs                                       | ND     | 50.00 | 47.87  | µg/L  | 96% 75-125   |              |
| B172942-MSD3 | <b>Matrix Spike Duplicate, (1744007-01)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 0.315  | 50.00 | 48.72  | µg/L  | 97% 75-125   | 0.4% 25      |
|              | As(V)                                       | 0.733  | 50.00 | 48.73  | µg/L  | 96% 75-125   | 0.5% 25      |
|              | DMAs  | ND     | 51.00 | 49.44  | µg/L  | 97% 75-125   | 0.9% 25      |
|              | MMAAs                                       | ND     | 50.00 | 47.51  | µg/L  | 95% 75-125   | 0.7% 25      |
| B172942-DUP4 | <b>Duplicate, (1744007-03)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 0.911  |       | 0.551  | µg/L  |              | 49% 25       |
|              | As(V)                                       | 0.852  |       | 0.780  | µg/L  |              | 9% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B172942-MS4  | <b>Matrix Spike, (1744007-03)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 0.911  | 50.00 | 48.32  | µg/L  | 95% 75-125   |              |
|              | As(V)                                       | 0.852  | 50.00 | 48.47  | µg/L  | 95% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 49.05  | µg/L  | 96% 75-125   |              |
|              | MMAAs                                       | ND     | 50.00 | 48.15  | µg/L  | 96% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B172942  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B172942-MSD4 | Matrix Spike Duplicate, (1744007-03) |        |       |        |       |              |              |
|              | As(III)                              | 0.911  | 50.00 | 48.28  | µg/L  | 95% 75-125   | 0.1% 25      |
|              | As(V)                                | 0.852  | 50.00 | 49.32  | µg/L  | 97% 75-125   | 2% 25        |
|              | DMAs                                 | ND     | 51.00 | 49.28  | µg/L  | 97% 75-125   | 0.5% 25      |
|              | MMAs                                 | ND     | 50.00 | 48.10  | µg/L  | 96% 75-125   | 0.1% 25      |



## Accuracy & Precision Summary

**Batch:** B172993  
**Lab Matrix:** Water  
**Method:** EPA 1631 E

| Sample              | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|--|--------|-------|--------|-------|--------------|--------------|
| <b>B172993-SRM1</b> | <b>Standard Reference Material (1741007, THg SRM NIST 1641d)</b><br>Hg |        | 15.68 | 15.53  | ng/L  | 99% 80-120   |              |
| <b>B172993-MS1</b>  | <b>Matrix Spike (1744001-02)</b><br>Hg                                 | 1.36   | 6.122 | 7.11   | ng/L  | 94% 71-125   |              |
| <b>B172993-MSD1</b> | <b>Matrix Spike Duplicate (1744001-02)</b><br>Hg                       | 1.36   | 6.122 | 7.19   | ng/L  | 95% 71-125   | 1% 24        |



## Accuracy & Precision Summary

Batch: B173101  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte                                       | Native | Spike    | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|----------|--------|-------|--------------|--------------|
| B173101-BS1  | Blank Spike, (1722014)                        |        |          |        |       |              |              |
|              | Cu  |        | 0.5000   | 0.5025 | µg/L  | 100% 75-125  |              |
|              | Ni  |        | 0.5000   | 0.5105 | µg/L  | 102% 75-125  |              |
|              | Pb  |        | 0.5000   | 0.5188 | µg/L  | 104% 75-125  |              |
| B173101-BS2  | Blank Spike, (1722014)                        |        |          |        |       |              |              |
|              | Cu  |        | 0.5000   | 0.5035 | µg/L  | 101% 75-125  |              |
|              | Ni  |        | 0.5000   | 0.5110 | µg/L  | 102% 75-125  |              |
|              | Pb  |        | 0.5000   | 0.5172 | µg/L  | 103% 75-125  |              |
| B173101-BS3  | Blank Spike, (1722014)                        |        |          |        |       |              |              |
|              | Cu  |        | 0.5000   | 0.5064 | µg/L  | 101% 75-125  |              |
|              | Ni  |        | 0.5000   | 0.5036 | µg/L  | 101% 75-125  |              |
|              | Pb  |        | 0.5000   | 0.5144 | µg/L  | 103% 75-125  |              |
| B173101-SRM1 | Standard Reference Material (1716086, NASS-7) |        |          |        |       |              |              |
|              | Cu  |        | 0.1990   | 0.1947 | µg/L  | 98% 75-125   |              |
|              | Ni  |        | 0.2480   | 0.2602 | µg/L  | 105% 75-125  |              |
| B173101-SRM2 | Standard Reference Material (1741023, SLEW-3) |        |          |        |       |              |              |
|              | Cu  |        | 1.550    | 1.750  | µg/L  | 113% 75-125  |              |
|              | Ni  |        | 1.230    | 1.429  | µg/L  | 116% 75-125  |              |
|              | Pb  |        | 0.009000 | 0.0084 | µg/L  | 94% 75-125   |              |
| B173101-DUP3 | Duplicate, (1742020-06)                       |        |          |        |       |              |              |
|              | Cu  | 64.68  |          | 67.09  | µg/L  |              | 4% 20        |
|              | Ni  | 6.220  |          | 6.947  | µg/L  |              | 11% 20       |
|              | Pb  | 67.71  |          | 69.72  | µg/L  |              | 3% 20        |
| B173101-MS3  | Matrix Spike, (1742020-06)                    |        |          |        |       |              |              |
|              | Cu  | 64.68  | 50.51    | 119.9  | µg/L  | 109% 75-125  |              |
|              | Ni  | 6.220  | 50.51    | 55.56  | µg/L  | 98% 75-125   |              |
|              | Pb  | 67.71  | 50.51    | 127.3  | µg/L  | 118% 75-125  |              |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173101  
**Lab Matrix:** Water  
**Method:** EPA 1640 Column

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B173101-MSD3 | Matrix Spike Duplicate, (1742020-06) |        |       |        |       |              |              |
|              | Cu                                   | 64.68  | 50.51 | 118.1  | µg/L  | 106% 75-125  | 2% 20        |
|              | Ni                                   | 6.220  | 50.51 | 56.37  | µg/L  | 99% 75-125   | 1% 20        |
|              | Pb                                   | 67.71  | 50.51 | 126.4  | µg/L  | 116% 75-125  | 0.7% 20      |



## Accuracy & Precision Summary

Batch: B173242  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173242-BS1  | <b>Blank Spike, (1738012)</b>                             |        |       |        |       |              |              |
|              |   | Al     |       | 400.0  | 349.2 | µg/L         | 87% 75-125   |
|              |   | As     |       | 20.00  | 20.64 | µg/L         | 103% 75-125  |
|              |   | Ca     |       | 400.0  | 374.1 | µg/L         | 94% 75-125   |
|              |   | Fe     |       | 400.0  | 394.1 | µg/L         | 99% 75-125   |
|              |   | K      |       | 400.0  | 390.5 | µg/L         | 98% 75-125   |
|              |   | Mg     |       | 400.0  | 366.7 | µg/L         | 92% 75-125   |
|              |   | Mn     |       | 20.00  | 19.64 | µg/L         | 98% 75-125   |
|              |   | Na     |       | 400.0  | 679.7 | µg/L         | 170% 75-125  |
|              |   | Si     |       | 200.0  | 210.9 | µg/L         | 105% 75-125  |
| B173242-BS2  | <b>Blank Spike, (1738012)</b>                             |        |       |        |       |              |              |
|              |   | Al     |       | 400.0  | 354.4 | µg/L         | 89% 75-125   |
|              |   | As     |       | 20.00  | 19.63 | µg/L         | 98% 75-125   |
|              |   | Ca     |       | 400.0  | 376.7 | µg/L         | 94% 75-125   |
|              |   | Fe     |       | 400.0  | 373.1 | µg/L         | 93% 75-125   |
|              |   | K      |       | 400.0  | 388.9 | µg/L         | 97% 75-125   |
|              |   | Mg     |       | 400.0  | 371.6 | µg/L         | 93% 75-125   |
|              |   | Mn     |       | 20.00  | 19.91 | µg/L         | 100% 75-125  |
|              |   | Na     |       | 400.0  | 684.5 | µg/L         | 171% 75-125  |
|              |   | Si     |       | 200.0  | 211.8 | µg/L         | 106% 75-125  |
| B173242-SRM1 | <b>Standard Reference Material (1724009, T221 as SRM)</b> |        |       |        |       |              |              |
|              |   | Al     |       | 374.0  | 344.1 | µg/L         | 92% 75-125   |
|              |   | As     |       | 17.70  | 18.45 | µg/L         | 104% 75-125  |
|              |   | Ca     |       | 16700  | 15820 | µg/L         | 95% 75-125   |
|              |   | Fe     |       | 328.0  | 321.8 | µg/L         | 98% 75-125   |
|              |   | K      |       | 1900   | 1865  | µg/L         | 98% 75-125   |
|              |   | Mg     |       | 3770   | 3501  | µg/L         | 93% 75-125   |
|              |   | Mn     |       | 33.60  | 33.00 | µg/L         | 98% 75-125   |
|              |   | Na     |       | 17400  | 16430 | µg/L         | 94% 75-125   |
|              |   | Si     |       | 5843   | 6546  | µg/L         | 112% 75-125  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173242  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173242-SRM2 | Standard Reference Material (1743005, NIST 1640a (batch SRM)) |        |       |        |       |              |              |
|              | Al  |        | 53.00 | 47.59  | µg/L  | 90% 75-125   |              |
|              | As  |        | 8.075 | 8.573  | µg/L  | 106% 75-125  |              |
|              | Fe  |        | 36.80 | 39.34  | µg/L  | 107% 75-125  |              |
|              | Mn  |        | 40.39 | 38.43  | µg/L  | 95% 75-125   |              |



## Accuracy & Precision Summary

Batch: B173242  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173242-DUP3</b> | <b>Duplicate, (1744007-10)</b>              |        |       |        |       |              |              |
|                     | Al  | 4507   |       | 4592   | µg/L  |              | 2% 20        |
|                     | As  | 1.456  |       | 1.459  | µg/L  |              | 0.2% 20      |
|                     | Ca  | 126500 |       | 127600 | µg/L  |              | 0.9% 20      |
|                     | Fe  | 8150   |       | 8105   | µg/L  |              | 0.5% 20      |
|                     | Mg  | 129700 |       | 132200 | µg/L  |              | 2% 20        |
|                     | Mn  | 478.2  |       | 487.1  | µg/L  |              | 2% 20        |
|                     | Na  | 308200 |       | 309000 | µg/L  |              | 0.3% 20      |
|                     | Si  | 33450  |       | 33740  | µg/L  |              | 0.9% 20      |
| <b>B173242-MS3</b>  | <b>Matrix Spike, (1744007-10)</b>           |        |       |        |       |              |              |
|                     | Al  | 4507   | 4082  | 8356   | µg/L  | 94% 75-125   |              |
|                     | As  | 1.456  | 408.2 | 433.2  | µg/L  | 106% 75-125  |              |
|                     | Ca  | 126500 | 4082  | 131900 | µg/L  | NR 75-125    |              |
|                     | Fe  | 8150   | 4082  | 12290  | µg/L  | 101% 75-125  |              |
|                     | Mg  | 129700 | 4082  | 137100 | µg/L  | NR 75-125    |              |
|                     | Mn  | 478.2  | 408.2 | 912.9  | µg/L  | 107% 75-125  |              |
|                     | Na  | 308200 | 4082  | 311400 | µg/L  | NR 75-125    |              |
|                     | Si  | 33450  | 40820 | 77300  | µg/L  | 107% 75-125  |              |
| <b>B173242-MSD3</b> | <b>Matrix Spike Duplicate, (1744007-10)</b> |        |       |        |       |              |              |
|                     | Al  | 4507   | 4082  | 8432   | µg/L  | 96% 75-125   | 0.9% 20      |
|                     | As  | 1.456  | 408.2 | 433.6  | µg/L  | 106% 75-125  | 0.1% 20      |
|                     | Ca  | 126500 | 4082  | 131100 | µg/L  | NR 75-125    | N/C 20       |
|                     | Fe  | 8150   | 4082  | 12230  | µg/L  | 100% 75-125  | 0.5% 20      |
|                     | Mg  | 129700 | 4082  | 135900 | µg/L  | NR 75-125    | N/C 20       |
|                     | Mn  | 478.2  | 408.2 | 912.6  | µg/L  | 106% 75-125  | 0.04% 20     |
|                     | Na  | 308200 | 4082  | 315500 | µg/L  | NR 75-125    | N/C 20       |
|                     | Si  | 33450  | 40820 | 77760  | µg/L  | 109% 75-125  | 0.6% 20      |
| <b>B173242-DUP9</b> | <b>Duplicate, (1744028-33)</b>              |        |       |        |       |              |              |
|                     | K   | 274600 |       | 275300 | µg/L  |              | 0.2% 20      |
| <b>B173242-MS9</b>  | <b>Matrix Spike, (1744028-33)</b>           |        |       |        |       |              |              |
|                     | K   | 274600 | 10200 | 285500 | µg/L  | NR 75-125    |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173242  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample       | Analyte                                   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173242-MSD9 | Matrix Spike Duplicate, (1744028-33)<br>K | 274600 | 10200 | 286400 | µg/L  | NR 75-125    | N/C 20       |



## Method Blanks & Reporting Limits

**Batch:** B172942  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.00         | µg/L  |                   |
| B172942-BLK2    | 0.00         | µg/L  |                   |
| B172942-BLK3    | 0.00         | µg/L  |                   |
| B172942-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.003        | µg/L  |                   |
| B172942-BLK2    | 0.002        | µg/L  |                   |
| B172942-BLK3    | 0.002        | µg/L  |                   |
| B172942-BLK4    | 0.001        | µg/L  |                   |
| <b>Average:</b> | <b>0.002</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** DMA<sub>s</sub>

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B172942-BLK1    | 0.00         | µg/L  |                   |
| B172942-BLK2    | 0.00         | µg/L  |                   |
| B172942-BLK3    | 0.00         | µg/L  |                   |
| B172942-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B172942-BLK1    | 0.00          | µg/L         |                   |
| B172942-BLK2    | 0.00          | µg/L         |                   |
| B172942-BLK3    | 0.00          | µg/L         |                   |
| B172942-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL:</b> 0.023 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
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## Method Blanks & Reporting Limits

**Batch:** B172993  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample          | Result | Units |                            |      |
|-----------------|--------|-------|----------------------------|------|
| B172993-BLK1    | 0.16   | ng/L  |                            |      |
| B172993-BLK2    | 0.10   | ng/L  |                            |      |
| B172993-BLK3    | 0.07   | ng/L  |                            |      |
| B172993-BLK4    | 0.06   | ng/L  |                            |      |
| <b>Average:</b> | 0.10   |       | <b>Standard Deviation:</b> | 0.05 |
| <b>Limit:</b>   | 0.50   |       | <b>Limit:</b>              | 0.10 |
|                 |        |       | <b>MDL:</b>                | 0.10 |
|                 |        |       | <b>MRL:</b>                | 0.40 |





## Method Blanks & Reporting Limits

**Batch:** B173101  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Cu

| Sample          | Result | Units |                    |
|-----------------|--------|-------|--------------------|
| B173101-BLK1    | 0.0050 | µg/L  |                    |
| B173101-BLK2    | 0.0039 | µg/L  |                    |
| B173101-BLK3    | 0.0095 | µg/L  |                    |
| B173101-BLK4    | 0.0053 | µg/L  |                    |
| <b>Average:</b> | 0.0059 |       | <b>MDL:</b> 0.0150 |
| <b>Limit:</b>   | 0.0450 |       | <b>MRL:</b> 0.0450 |

**Analyte:** Ni

| Sample          | Result | Units |                    |
|-----------------|--------|-------|--------------------|
| B173101-BLK1    | 0.0013 | µg/L  |                    |
| B173101-BLK2    | 0.0019 | µg/L  |                    |
| B173101-BLK3    | 0.0046 | µg/L  |                    |
| B173101-BLK4    | 0.0062 | µg/L  |                    |
| <b>Average:</b> | 0.0035 |       | <b>MDL:</b> 0.0070 |
| <b>Limit:</b>   | 0.0300 |       | <b>MRL:</b> 0.0300 |

**Analyte:** Pb

| Sample          | Result | Units |                    |
|-----------------|--------|-------|--------------------|
| B173101-BLK1    | 0.0001 | µg/L  |                    |
| B173101-BLK2    | 0.0010 | µg/L  |                    |
| B173101-BLK3    | 0.0015 | µg/L  |                    |
| B173101-BLK4    | 0.0013 | µg/L  |                    |
| <b>Average:</b> | 0.0010 |       | <b>MDL:</b> 0.0050 |
| <b>Limit:</b>   | 0.0150 |       | <b>MRL:</b> 0.0150 |



## Method Blanks & Reporting Limits

**Batch:** B173242  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Al

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173242-BLK1    | -0.043        | µg/L  |                   |
| B173242-BLK2    | -0.048        | µg/L  |                   |
| B173242-BLK3    | -0.033        | µg/L  |                   |
| B173242-BLK4    | -0.038        | µg/L  |                   |
| <b>Average:</b> | <b>-0.040</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>2.000</b>  |       | <b>MRL: 2.00</b>  |

**Analyte:** As

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173242-BLK1    | -0.002        | µg/L  |                   |
| B173242-BLK2    | -0.002        | µg/L  |                   |
| B173242-BLK3    | -0.0004       | µg/L  |                   |
| B173242-BLK4    | 0.0005        | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.011</b> |
| <b>Limit:</b>   | <b>0.040</b>  |       | <b>MRL: 0.040</b> |

**Analyte:** Ca

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B173242-BLK1    | -0.097        | µg/L  |                  |
| B173242-BLK2    | -0.103        | µg/L  |                  |
| B173242-BLK3    | -0.059        | µg/L  |                  |
| B173242-BLK4    | -0.007        | µg/L  |                  |
| <b>Average:</b> | <b>-0.067</b> |       | <b>MDL: 4.60</b> |
| <b>Limit:</b>   | <b>13.800</b> |       | <b>MRL: 13.8</b> |



## Method Blanks & Reporting Limits

### Analyte: Fe

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173242-BLK1    | 0.03        | µg/L  |                  |
| B173242-BLK2    | 0.01        | µg/L  |                  |
| B173242-BLK3    | 0.11        | µg/L  |                  |
| B173242-BLK4    | -0.03       | µg/L  |                  |
| <b>Average:</b> | <b>0.03</b> |       | <b>MDL: 0.28</b> |
| <b>Limit:</b>   | <b>0.85</b> |       | <b>MRL: 0.85</b> |

### Analyte: Mg

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B173242-BLK1    | -0.04        | µg/L  |                  |
| B173242-BLK2    | -0.04        | µg/L  |                  |
| B173242-BLK3    | -0.03        | µg/L  |                  |
| B173242-BLK4    | -0.03        | µg/L  |                  |
| <b>Average:</b> | <b>-0.04</b> |       | <b>MDL: 0.54</b> |
| <b>Limit:</b>   | <b>1.70</b>  |       | <b>MRL: 1.70</b> |

### Analyte: Mn

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173242-BLK1    | -0.0001      | µg/L  |                   |
| B173242-BLK2    | -0.0009      | µg/L  |                   |
| B173242-BLK3    | -0.0005      | µg/L  |                   |
| B173242-BLK4    | -0.0004      | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.040</b> |       | <b>MRL: 0.040</b> |

### Analyte: Na

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173242-BLK1    | -0.347        | µg/L  |                   |
| B173242-BLK2    | -0.316        | µg/L  |                   |
| B173242-BLK3    | 0.048         | µg/L  |                   |
| B173242-BLK4    | -0.165        | µg/L  |                   |
| <b>Average:</b> | <b>-0.195</b> |       | <b>MDL: 0.740</b> |
| <b>Limit:</b>   | <b>1.470</b>  |       | <b>MRL: 1.47</b>  |

**Project ID:** PTC-OA1701  
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BAL Report 1744007  
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**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B173242-BLK1    | -0.11         | µg/L         |                  |
| B173242-BLK2    | -0.51         | µg/L         |                  |
| B173242-BLK3    | -0.06         | µg/L         |                  |
| B173242-BLK4    | -0.35         | µg/L         |                  |
| <b>Average:</b> | <b>-0.26</b>  |              | <b>MDL: 0.90</b> |
| <b>Limit:</b>   | <b>4.00</b>   |              | <b>MRL: 4.00</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744007-01           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/27/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-711-1-102717-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/30/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler - 1744007   |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler - 1744007   |

| <b>Lab ID:</b> 1744007-02           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/27/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-711-1-102717-(21) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/30/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler - 1744007   |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler - 1744007   |

| <b>Lab ID:</b> 1744007-03           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/27/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-713-2-102717-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/30/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler - 1744007   |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler - 1744007   |

| <b>Lab ID:</b> 1744007-04           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/27/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-8H1-1-102717-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/30/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6 mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler - 1744007   |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler - 1744007   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744007-05           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/27/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7G1-1-102717-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/30/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1744007 |
| B                                   | EXTRA_VOL  | 6mL                         | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1744007 |

| <b>Lab ID:</b> 1744007-06           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/27/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-7G1-2-102717-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/30/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1744007 |
| B                                   | EXTRA_VOL  | 6mL                         | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1744007 |

| <b>Lab ID:</b> 1744007-07           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/27/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-8G2-1-102717-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/30/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1744007 |
| B                                   | EXTRA_VOL  | 6mL                         | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1744007 |

| <b>Lab ID:</b> 1744007-08           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 10/27/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-8G3-2-102717-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 10/30/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6 mL                        | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1744007 |
| B                                   | EXTRA_VOL  | 6mL                         | 16-0257 | EDTA (PP)                    | n/a   |    | Cooler - 1744007 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744007-09            |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/27/2017 |                    |
|--------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-8F2-2R-102717-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/30/2017  |                    |
| <b>Des</b>                           | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | Vacutainer       | 6 mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler - 1744007   |
| B                                    | EXTRA_VOL        | 6mL         | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler - 1744007   |

| <b>Lab ID:</b> 1744007-10         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/27/2017 |                    |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-131+00-1-102717 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/30/2017  |                    |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                 | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler - 1744007   |
| B                                 | Bottle HDPE ICP-W       | 250 mL      | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1744007   |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1744007   |

| <b>Lab ID:</b> 1744007-11              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/27/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-131+00-1-102717-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/30/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Vacutainer              | 6 mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1744007   |
| B                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1744007   |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler - 1744007   |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744007   |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744007   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744007  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### **Cooler - 1744007**

**Received:** October 30, 2017 9:38  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 2.0 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#10

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes





# Chain-of-Custody Form

BAL Report 1744007

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Jeremy Maute For BAL use only Date: 10/30/17  
 Work Order ID: \_\_\_\_\_ Time: 9:38  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |                    | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|--------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time               | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 1  | GW-70I1-1-102717-(20)                   | 10-27-17           | 845                             | Water                | 2               | Y                 | N  |   |   |   |   | X   |  | 1MS      | MS/MSD                               |
| 2  | GW-71I1-1-102717-(21)                   |                    | 855                             |                      |                 |                   |  |   |   |   |   |   |  | 1MS      |                                      |
| 3  | GW-713-2-102717-(20)                    |                    | 850                             |                      |                 |                   |  |   |   |   |   |   |  | 3MS      | MS/MSD                               |
| 4  | GW-8H1-1-102717-(20)                    |                    | 950                             |                      |                 |                   |  |   |   |   |   |   |  | 20MS     |                                      |
| 5  | GW-7G1-1-102717-(20)                    |                    | 1115                            |                      |                 |                   |  |   |   |   |   |   |  | 3MS      |                                      |
| 6  | GW-7G1-2-102717-(20)                    |                    | 1015                            |                      |                 |                   |  |   |   |   |   |   |  | 28MS     |                                      |
| 7  | GW-8G2-1-102717-(20)                    |                    | 1100                            |                      |                 |                   |  |   |   |   |   |   |  | 27MS     |                                      |
| 8  | GW-8G3-2-102717-(20)                    |                    | 1150                            |                      |                 |                   |  |   |   |   |   |   |  | 28MS     |                                      |
| 9  | GW-8F2-2R-102717-(20)                   |                    | 1210                            |                      |                 |                   |  |   |   |   |   |   |  | 33MS     |                                      |
| 10   |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>LM</u>   | Date: <u>10/30/17</u>                   | Time: <u>09:38</u> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |                                      |
| Received By: _____   | Date: _____                             | Time: _____        | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |

Print



# Chain-of-Custody Form

BAL Report 1744007

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: Hepler For BAL use only Date: 10/30/17

Work Order ID: \_\_\_\_\_ Time: 9:38

Project ID: \_\_\_\_\_

Mail Invoice to:  
Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to:  
Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

| Requested TAT (business days)  | Collection                       |                          | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |  |
|--|----------------------------------|--------------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--|
|  | Date                             | Time                     | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement     |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |
| Sample ID  |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          | Specify Here                             |
| 1  | <del>GW-131+00-2-102717</del>    | <del>10/27/17 1300</del> | <del>WATER</del>   | <del>5</del>         | <del>N</del>    | <del>N</del>              |  |   |   | X   | X   | X   | X  |          | Dissolved Samples field filtered 0.45 um |
| 2  | <del>GW-131+00-2-102717(1)</del> | <del>1300</del>          |                    | <del>5</del>         |                 |                           |  |   |   |   |   |   |  |          |  |
| 3  | GW-131+00-1-102717               | 1320                     |                    | 3                    | N               |                           |  |   | X   |   |   |   |  |          |  |
| 4  | GW-131+00-1-102717-(20)          | 1320                     |                    | 5                    | Y               |                           |  |   |   | X   | X   | X   |  |          |  |
| 5  |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |
| 6  |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |
| 7  |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |
| 8  |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |
| 9  |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |
| 10   |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |
| Trip Blank (specify)   |                                  |                          |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |
| Relinquished By: <u>Maute</u>  | Date: <u>10/30/17</u>            | Time: <u>0938</u>        | Relinquished By:   | Date:                | Time:           | Total Number of Packages: |  |   |   |   |   |   |  |          |  |
| Received By:   | Date:                            | Time:                    |                    |                      |                 |                           |  |   |   |   |   |   |  |          |  |



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

January 11, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On October 31, 2017, Brooks Applied Labs (BAL) received thirty-three (33) water samples in a sealed container with a temperature of 3.4°C. The samples were logged-in for the total recoverable and dissolved metals (aluminum [Al], arsenic [As], calcium [Ca], iron [Fe], potassium [K], magnesium [Mg], manganese [Mg], sodium [Na], and silicon [Si]) analyses via digestion and subsequent analysis by modified EPA Method 1638. The silicon results are operationally defined as nitric acid-soluble [Si]. The samples were logged in for total recoverable and dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. In cases where an analytical bias is observed for (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640, the copper, lead, and/or nickel results are quantified and reported via modified EPA Method 1638. The samples were logged-in for the total mercury [Hg] analysis by EPA Method 1631E. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The samples submitted for arsenic speciation and dissolved analyses were filtered in the field by the client.

The filtered fractions (arsenic speciation, trace metals, and column chelation containers) for sample **GW-131+00-2-102717-(20)** were significantly darker in color compared to the corresponding unfiltered fraction (**GW-131+00-2-102717**). The client was notified. The lighter colored samples yielded results greater than or equal to analyte concentrations in the darker colored (field filtered) fractions in all cases, except for nickel (*see narration in Batch B173242*). Several other analytes (in addition to the target analytes) were monitored and the trend was consistent. Consequently, the “dissolved” basis was retained for the samples with the significantly darker appearance and the lighter colored sample kept the “unfiltered” assignment. Samples 1744028-09 and 1744028-10 were logged in and reported according to the “filtered” versus “unfiltered” assignments designated on the associated sample container labels.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.



Total Recoverable and Dissolved Metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, and Si) Analysis by EPA Method 1638, Mod.

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Total recoverable and dissolved metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, Ni, Pb, and Si) quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

In some cases, higher dilutions were necessary to mitigate matrix interference on the analytical platform. In these instances, the MDLs and MRLs were elevated, and there are some cases where the target MDL/MRLs were not met as a result.

### **Batch B173242**

The nickel spike recovery for the reference material sample (B173242-SRM1) was greater than the upper control limit of 130% (at 170%). The elevated recovery was limited to nickel; other target analytes reference material recoveries were within acceptable limits. Another reference material (B173242-SRM2) was employed and the nickel recovery was acceptable. Nickel recoveries for all blank spike samples and matrix spike/matrix spike duplicate (MS/MSD) samples in the batch were within acceptable ranges, demonstrating that the applied digest stabilizes nickel in solution. Since the nickel spike recovery outlier in B173242-SRM1 may be due to spot contamination, results were compared to re-analyses, and nickel results were in good agreement with results in Batch B173242. Nickel results in Batch B173242 are reported without qualification.

The dissolved nickel result was greater than the corresponding total recoverable nickel result for the client sample **GW-131+00-2-102717** (1744028-09 & 1744028-10). Re-analyses confirmed the results. Nickel results from column chelation (EPA Method 1640 MOD) yielded a similar trend. The container labels were checked and there was no indication of sample IDs getting switched. Since the same samples produced total recoverable results > dissolved results for the remaining target analytes, the nickel values yielded are deemed representative of the supplied samples. Nickel results are reported from Batch B173242 and no data were qualified.

The sodium spike recoveries for the blank spike samples (B173242-BS1 and B173242-BS2) were greater than the upper control limit of 130% (at 170% and 171%, respectively). The blank spike samples were created at the prep step, prior to the in-bottle oven digest. Since the samples had undergone an “in-bottle digest”, it is not possible to redo the digest with new blank spike samples. A certified reference material (B173242-SRM1) was analyzed in the analytical run. The reference material recovery for total sodium was acceptable at 98%, demonstrating that the analytical method stabilizes sodium in solution. However, due to the elevated sodium recoveries in B173242-BS1 and B173242-BS2, all sodium results in this batch are qualified as estimated “J-1” due to a potential high bias.

The matrix spike recovery for silicon in B173242-MSD4 was greater than the lab control limit of 125%, at 126%. The work plan for this project lists an upper control limit of 130% for silicon. Since this recovery is within the limits defined by the project work plan, no corrective action was necessary, and no data were qualified.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. BAL requires that the MRL is at least 2 times the value of the corresponding MDL. Due to an elevated MDL, it was necessary to raise the Na MRL to 2 times the value of the MDL. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

Total Recoverable Metals Analysis by EPA Method 1640, Mod.

A high bias due to the sample matrix was observed for Cu, Ni, and Pb, when compared to EPA Method 1638, Mod results. Consequently, Cu, Ni, and Pb are reported from EPA Method 1638, Mod analyses.

Total and Dissolved Mercury Quantitation by EPA Method 1631E

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

**Batch B172993**

For several samples, it was necessary to use a higher volume of the BrCl preservative in order to oxidize the samples prior to analysis. In these instances, the MDLs and MRLs were elevated, and there are some cases (1744028-10) where the target MDL/MRLs were not met as a result.

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

**Batch B173027**

The sum of arsenic species was greater than the corresponding dissolved arsenic result for the client samples 1744028-10, 1744028-14, 1744028-16, and 1744028-18. Re-analyses confirmed the results. The arsenic speciation fractions were screened for total arsenic, verifying the elevated concentrations. The container labels were checked and there was no indication of sample IDs getting switched. Since re-analyses confirmed, the arsenic speciation results for 1744028-10, 1744028-14, 1744028-16, and 1744028-18 were reported from Batch B173027 and results are deemed representative of the supplied samples.

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

With the exceptions noted above, all data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksapplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|-------------------------|------------|---------------|--------|------------|------------|
| GW-129+65-0-103017      | 1744028-01 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-129+65-0-103017-(20) | 1744028-02 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-128+30-0-103017      | 1744028-03 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-128+30-0-103017-(20) | 1744028-04 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-128+30-2-103017      | 1744028-05 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-128+30-2-103017-(20) | 1744028-06 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-129+65-2-103017      | 1744028-07 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-129+65-2-103017-(20) | 1744028-08 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-131+00-2-102717      | 1744028-09 | Water         | Sample | 10/27/2017 | 10/31/2017 |
| GW-131+00-2-102717-(20) | 1744028-10 | Water         | Sample | 10/27/2017 | 10/31/2017 |
| GW-126+90-2-103017      | 1744028-11 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-126+90-2-103017-(20) | 1744028-12 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-125+50-2-103017      | 1744028-13 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-125+50-2-103017-(20) | 1744028-14 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-124+00-2-103017      | 1744028-15 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-124+00-2-103017-(20) | 1744028-16 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-121+80-2-103017      | 1744028-17 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-121+80-2-103017-(20) | 1744028-18 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-6E3-2-103017-(20)    | 1744028-19 | Water         | Sample | 10/30/2017 | 10/31/2017 |
| GW-129+65-1-103117      | 1744028-20 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-129+65-1-103117-(20) | 1744028-21 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-128+30-1-103117      | 1744028-22 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-128+30-1-103117-(20) | 1744028-23 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-125+50-1-103117      | 1744028-24 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-125+50-1-103117-(20) | 1744028-25 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-126+90-0-103117      | 1744028-26 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-126+90-0-103117-(20) | 1744028-27 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-125+50-0-103117      | 1744028-28 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-125+50-0-103117-(20) | 1744028-29 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-124+00-1-103117      | 1744028-30 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-124+00-1-103117-(20) | 1744028-31 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-124+00-0-103117      | 1744028-32 | Water         | Sample | 10/31/2017 | 10/31/2017 |
| GW-124+00-0-103117-(20) | 1744028-33 | Water         | Sample | 10/31/2017 | 10/31/2017 |





## Batch Summary

| Analyte | Lab Matrix | Method       | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|--------------|------------|------------|---------|----------|
| Al      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| As      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| As      | Water      | EPA 1638 Mod | 11/03/2017 | 12/20/2017 | B173242 | 1701590  |
| As      | Water      | EPA 1638 Mod | 11/03/2017 | 12/18/2017 | B173242 | 1701579  |
| As(III) | Water      | SOP BAL-4100 | 11/07/2017 | 11/08/2017 | B173027 | 1701411  |
| As(V)   | Water      | SOP BAL-4100 | 11/07/2017 | 11/08/2017 | B173027 | 1701411  |
| Ca      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Cu      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Cu      | Water      | EPA 1638 Mod | 11/03/2017 | 12/10/2017 | B173242 | 1701537  |
| DMAs    | Water      | SOP BAL-4100 | 11/07/2017 | 11/08/2017 | B173027 | 1701411  |
| Fe      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Fe      | Water      | EPA 1638 Mod | 11/03/2017 | 12/14/2017 | B173242 | 1701552  |
| Hg      | Water      | EPA 1631 E   | 11/03/2017 | 11/06/2017 | B172993 | 1701378  |
| Hg      | Water      | EPA 1631 E   | 11/03/2017 | 11/08/2017 | B172993 | 1701394  |
| K       | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| K       | Water      | EPA 1638 Mod | 11/03/2017 | 12/13/2017 | B173242 | 1701552  |
| Mg      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Mg      | Water      | EPA 1638 Mod | 11/03/2017 | 12/13/2017 | B173242 | 1701552  |
| MMAAs   | Water      | SOP BAL-4100 | 11/07/2017 | 11/08/2017 | B173027 | 1701411  |
| Mn      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Na      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Na      | Water      | EPA 1638 Mod | 11/03/2017 | 12/13/2017 | B173242 | 1701552  |
| Ni      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Ni      | Water      | EPA 1638 Mod | 11/03/2017 | 12/13/2017 | B173242 | 1701552  |
| Pb      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |
| Pb      | Water      | EPA 1638 Mod | 11/03/2017 | 12/10/2017 | B173242 | 1701537  |
| Si      | Water      | EPA 1638 Mod | 11/03/2017 | 12/02/2017 | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-129+65-0-103017</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-01                     | As      | Water         | TR    | 1.81    | J         | 1.12  | 4.08  | µg/L | B173242 | 1701579  |
| 1744028-01                     | Cu      | Water         | TR    | 4.85    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-01                     | Hg      | Water         | TR    | 1.86    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-01                     | Ni      | Water         | TR    | 638     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-01                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| <b>GW-129+65-0-103017-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-02                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-02                     | As      | Water         | D     | 2.00    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-02                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-02                     | As(V)   | Water         | D     | 1.27    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-02                     | Ca      | Water         | D     | 236000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-02                     | Cu      | Water         | D     | 3.82    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-02                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-02                     | Fe      | Water         | D     | ≤ 11.4  | U         | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-02                     | Hg      | Water         | D     | 1.31    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-02                     | K       | Water         | D     | 224000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-02                     | Mg      | Water         | D     | 631000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-02                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-02                     | Mn      | Water         | D     | 4.84    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-02                     | Na      | Water         | D     | 5420000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-02                     | Ni      | Water         | D     | 769     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-02                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-02                     | Si      | Water         | D     | 6040    |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-128+30-0-103017</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-03                     | As      | Water         | TR    | 14.2    |           | 1.12  | 4.08  | µg/L | B173242 | 1701579  |
| 1744028-03                     | Cu      | Water         | TR    | 10.2    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-03                     | Hg      | Water         | TR    | 2.28    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-03                     | Ni      | Water         | TR    | 455     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-03                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-128+30-0-103017-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-04                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-04                     | As      | Water         | D     | 14.0    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-04                     | As(III) | Water         | D     | 0.273   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-04                     | As(V)   | Water         | D     | 12.0    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-04                     | Ca      | Water         | D     | 302000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-04                     | Cu      | Water         | D     | 8.28    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-04                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-04                     | Fe      | Water         | D     | 46.7    |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-04                     | Hg      | Water         | D     | 1.79    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-04                     | K       | Water         | D     | 280000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-04                     | Mg      | Water         | D     | 773000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-04                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-04                     | Mn      | Water         | D     | 20.4    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-04                     | Na      | Water         | D     | 6540000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-04                     | Ni      | Water         | D     | 434     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-04                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-04                     | Si      | Water         | D     | 5750    |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-128+30-2-103017</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-05                     | As      | Water         | TR    | 190     |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-05                     | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-05                     | Hg      | Water         | TR    | 2.30    |           | 0.10  | 0.41  | ng/L | B172993 | 1701378  |
| 1744028-05                     | Ni      | Water         | TR    | 2.41    | J         | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-05                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-128+30-2-103017-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-06                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-06                     | As      | Water         | D     | 91.7    |           | 1.12  | 4.08  | µg/L | B173242 | 1701579  |
| 1744028-06                     | As(III) | Water         | D     | 17.3    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-06                     | As(V)   | Water         | D     | 2.79    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-06                     | Ca      | Water         | D     | 70500   |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-06                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-06                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-06                     | Fe      | Water         | D     | ≤ 11.4  | U         | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-06                     | Hg      | Water         | D     | 2.28    |           | 0.10  | 0.41  | ng/L | B172993 | 1701378  |
| 1744028-06                     | K       | Water         | D     | 117000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-06                     | Mg      | Water         | D     | 195000  |           | 22.0  | 69.4  | µg/L | B173242 | 1701504  |
| 1744028-06                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-06                     | Mn      | Water         | D     | 5.42    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-06                     | Na      | Water         | D     | 3840000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-06                     | Ni      | Water         | D     | 1.43    | J         | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-06                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-06                     | Si      | Water         | D     | 26500   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-129+65-2-103017</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-07                     | As      | Water         | TR    | 4.23    |           | 1.12  | 4.08  | µg/L | B173242 | 1701579  |
| 1744028-07                     | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-07                     | Hg      | Water         | TR    | 0.24    | J         | 0.10  | 0.42  | ng/L | B172993 | 1701378  |
| 1744028-07                     | Ni      | Water         | TR    | 1.03    | J         | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-07                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-129+65-2-103017-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-08                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-08                     | As      | Water         | D     | 3.85    | J         | 1.12  | 4.08  | µg/L | B173242 | 1701590  |
| 1744028-08                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-08                     | As(V)   | Water         | D     | 0.727   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-08                     | Ca      | Water         | D     | 240000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-08                     | Cu      | Water         | D     | ≤ 2.24  | U         | 2.24  | 6.73  | µg/L | B173242 | 1701537  |
| 1744028-08                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-08                     | Fe      | Water         | D     | ≤ 40.8  | U         | 40.8  | 408   | µg/L | B173242 | 1701552  |
| 1744028-08                     | Hg      | Water         | D     | 0.22    | J         | 0.10  | 0.42  | ng/L | B172993 | 1701378  |
| 1744028-08                     | K       | Water         | D     | 191000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-08                     | Mg      | Water         | D     | 657000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-08                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-08                     | Mn      | Water         | D     | 18.6    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-08                     | Na      | Water         | D     | 5190000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-08                     | Ni      | Water         | D     | 0.992   | J         | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-08                     | Pb      | Water         | D     | 0.304   | J         | 0.102 | 0.408 | µg/L | B173242 | 1701537  |
| 1744028-08                     | Si      | Water         | D     | 23900   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-131+00-2-102717</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-09                     | As      | Water         | TR    | 26.9    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-09                     | Cu      | Water         | TR    | 2.11    | J         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-09                     | Hg      | Water         | TR    | 1.10    |           | 0.10  | 0.42  | ng/L | B172993 | 1701378  |
| 1744028-09                     | Ni      | Water         | TR    | 33.7    |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-09                     | Pb      | Water         | TR    | 0.191   |           | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-131+00-2-102717-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-10                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-10                     | As      | Water         | D     | 1.66    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-10                     | As(III) | Water         | D     | 5.31    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-10                     | As(V)   | Water         | D     | 2.75    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-10                     | Ca      | Water         | D     | 79900   |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-10                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-10                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-10                     | Fe      | Water         | D     | 416     |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-10                     | Hg      | Water         | D     | ≤ 1.00  | U         | 1.00  | 4.00  | ng/L | B172993 | 1701378  |
| 1744028-10                     | K       | Water         | D     | 121000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-10                     | Mg      | Water         | D     | 166000  |           | 22.0  | 69.4  | µg/L | B173242 | 1701504  |
| 1744028-10                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-10                     | Mn      | Water         | D     | 41.1    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-10                     | Na      | Water         | D     | 6130000 | J-1       | 408   | 4080  | µg/L | B173242 | 1701552  |
| 1744028-10                     | Ni      | Water         | D     | 128     |           | 2.35  | 7.04  | µg/L | B173242 | 1701552  |
| 1744028-10                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-10                     | Si      | Water         | D     | 34300   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-126+90-2-103017</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-11                     | As      | Water         | TR    | 1120    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-11                     | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-11                     | Hg      | Water         | TR    | 1.15    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-11                     | Ni      | Water         | TR    | 1.17    | J         | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-11                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-126+90-2-103017-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-12                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-12                     | As      | Water         | D     | 1130    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-12                     | As(III) | Water         | D     | 775     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-12                     | As(V)   | Water         | D     | 11.6    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-12                     | Ca      | Water         | D     | 367000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-12                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-12                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-12                     | Fe      | Water         | D     | 265     |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-12                     | Hg      | Water         | D     | 1.28    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-12                     | K       | Water         | D     | 252000  |           | 2450  | 10200 | µg/L | B173242 | 1701552  |
| 1744028-12                     | Mg      | Water         | D     | 886000  |           | 551   | 1730  | µg/L | B173242 | 1701552  |
| 1744028-12                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-12                     | Mn      | Water         | D     | 25.9    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-12                     | Na      | Water         | D     | 7020000 | J-1       | 408   | 4080  | µg/L | B173242 | 1701552  |
| 1744028-12                     | Ni      | Water         | D     | 1.16    | J         | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-12                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-12                     | Si      | Water         | D     | 30800   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-125+50-2-103017</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-13                     | As      | Water         | TR    | 732     |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-13                     | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-13                     | Hg      | Water         | TR    | 2.23    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-13                     | Ni      | Water         | TR    | ≤ 0.939 | U         | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-13                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |





## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-125+50-2-103017-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-14                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-14                     | As      | Water         | D     | 375     |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-14                     | As(III) | Water         | D     | 613     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-14                     | As(V)   | Water         | D     | 25.0    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-14                     | Ca      | Water         | D     | 168000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-14                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-14                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-14                     | Fe      | Water         | D     | 2200    |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-14                     | Hg      | Water         | D     | 0.53    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-14                     | K       | Water         | D     | 131000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-14                     | Mg      | Water         | D     | 830000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-14                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-14                     | Mn      | Water         | D     | 56.6    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-14                     | Na      | Water         | D     | 6480000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-14                     | Ni      | Water         | D     | ≤ 0.939 | U         | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-14                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-14                     | Si      | Water         | D     | 16300   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-124+00-2-103017</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-15                     | As      | Water         | TR    | 34400   |           | 11.2  | 40.8  | µg/L | B173242 | 1701504  |
| 1744028-15                     | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-15                     | Hg      | Water         | TR    | 20.6    |           | 1.00  | 4.00  | ng/L | B172993 | 1701378  |
| 1744028-15                     | Ni      | Water         | TR    | 18.9    |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-15                     | Pb      | Water         | TR    | 0.219   |           | 0.041 | 0.163 | µg/L | B173242 | 1701504  |





## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-124+00-2-103017-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-16                     | Al      | Water         | D     | 66.9    | J         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-16                     | As      | Water         | D     | 39200   |           | 11.2  | 40.8  | µg/L | B173242 | 1701504  |
| 1744028-16                     | As(III) | Water         | D     | 48600   |           | 20.0  | 100   | µg/L | B173027 | 1701411  |
| 1744028-16                     | As(V)   | Water         | D     | 7940    |           | 20.0  | 100   | µg/L | B173027 | 1701411  |
| 1744028-16                     | Ca      | Water         | D     | 75500   |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-16                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-16                     | DMAs    | Water         | D     | ≤ 25.0  | U         | 25.0  | 105   | µg/L | B173027 | 1701411  |
| 1744028-16                     | Fe      | Water         | D     | 464     |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-16                     | Hg      | Water         | D     | 12.6    |           | 1.00  | 4.00  | ng/L | B172993 | 1701394  |
| 1744028-16                     | K       | Water         | D     | 143000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-16                     | Mg      | Water         | D     | 179000  |           | 22.0  | 69.4  | µg/L | B173242 | 1701504  |
| 1744028-16                     | MMAAs   | Water         | D     | ≤ 20.0  | U         | 20.0  | 115   | µg/L | B173027 | 1701411  |
| 1744028-16                     | Mn      | Water         | D     | 81.8    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-16                     | Na      | Water         | D     | 7530000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-16                     | Ni      | Water         | D     | 18.4    |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-16                     | Pb      | Water         | D     | 0.135   | J         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-16                     | Si      | Water         | D     | 19900   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-121+80-2-103017</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-17                     | As      | Water         | TR    | 118     |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-17                     | Cu      | Water         | TR    | 2.70    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-17                     | Hg      | Water         | TR    | 8.08    |           | 0.11  | 0.42  | ng/L | B172993 | 1701378  |
| 1744028-17                     | Ni      | Water         | TR    | 19.8    |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-17                     | Pb      | Water         | TR    | 1.11    |           | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-121+80-2-103017-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-18                     | Al      | Water         | D     | 242     |           | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-18                     | As      | Water         | D     | 81.7    |           | 1.12  | 4.08  | µg/L | B173242 | 1701579  |
| 1744028-18                     | As(III) | Water         | D     | 22.3    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-18                     | As(V)   | Water         | D     | 496     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-18                     | Ca      | Water         | D     | 9690    |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-18                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-18                     | DMAs    | Water         | D     | 2.13    |           | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-18                     | Fe      | Water         | D     | 545     |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-18                     | Hg      | Water         | D     | 6.98    |           | 0.11  | 0.42  | ng/L | B172993 | 1701378  |
| 1744028-18                     | K       | Water         | D     | 39200   |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-18                     | Mg      | Water         | D     | 3460    |           | 22.0  | 69.4  | µg/L | B173242 | 1701504  |
| 1744028-18                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-18                     | Mn      | Water         | D     | 18.9    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-18                     | Na      | Water         | D     | 4010000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-18                     | Ni      | Water         | D     | 17.4    |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-18                     | Pb      | Water         | D     | 0.696   |           | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-18                     | Si      | Water         | D     | 79000   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-6E3-2-103017-(20)</b>    |         |               |       |         |           |       |       |      |         |          |
| 1744028-19                     | As(III) | Water         | D     | 39400   |           | 20.0  | 100   | µg/L | B173027 | 1701411  |
| 1744028-19                     | As(V)   | Water         | D     | 17200   |           | 20.0  | 100   | µg/L | B173027 | 1701411  |
| 1744028-19                     | DMAs    | Water         | D     | ≤ 25.0  | U         | 25.0  | 105   | µg/L | B173027 | 1701411  |
| 1744028-19                     | MMAs    | Water         | D     | ≤ 20.0  | U         | 20.0  | 115   | µg/L | B173027 | 1701411  |
| <b>GW-129+65-1-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-20                     | As      | Water         | TR    | 250     |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-20                     | Cu      | Water         | TR    | 689     |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-20                     | Hg      | Water         | TR    | 254     |           | 0.10  | 0.42  | ng/L | B172993 | 1701378  |
| 1744028-20                     | Ni      | Water         | TR    | 999     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-20                     | Pb      | Water         | TR    | 0.227   |           | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-129+65-1-103117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-21                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-21                     | As      | Water         | D     | 5.69    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-21                     | As(III) | Water         | D     | 0.220   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-21                     | As(V)   | Water         | D     | 0.905   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-21                     | Ca      | Water         | D     | 199000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-21                     | Cu      | Water         | D     | 52.9    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-21                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-21                     | Fe      | Water         | D     | 2050    |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-21                     | Hg      | Water         | D     | 6.03    |           | 0.10  | 0.41  | ng/L | B172993 | 1701378  |
| 1744028-21                     | K       | Water         | D     | 197000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-21                     | Mg      | Water         | D     | 561000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-21                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-21                     | Mn      | Water         | D     | 165     |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-21                     | Na      | Water         | D     | 4920000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-21                     | Ni      | Water         | D     | 890     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-21                     | Pb      | Water         | D     | 0.086   | J         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-21                     | Si      | Water         | D     | 6460    |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-128+30-1-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-22                     | As      | Water         | TR    | 2610    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-22                     | Cu      | Water         | TR    | 2000    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-22                     | Hg      | Water         | TR    | 6.53    |           | 0.10  | 0.42  | ng/L | B172993 | 1701378  |
| 1744028-22                     | Ni      | Water         | TR    | 11900   |           | 23.5  | 70.4  | µg/L | B173242 | 1701552  |
| 1744028-22                     | Pb      | Water         | TR    | 1.24    |           | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-128+30-1-103117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-23                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-23                     | As      | Water         | D     | 7.93    |           | 1.12  | 4.08  | µg/L | B173242 | 1701579  |
| 1744028-23                     | As(III) | Water         | D     | 2.21    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-23                     | As(V)   | Water         | D     | 3.30    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-23                     | Ca      | Water         | D     | 290000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-23                     | Cu      | Water         | D     | 670     |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-23                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-23                     | Fe      | Water         | D     | 53700   |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-23                     | Hg      | Water         | D     | 0.98    |           | 0.10  | 0.42  | ng/L | B172993 | 1701378  |
| 1744028-23                     | K       | Water         | D     | 251000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-23                     | Mg      | Water         | D     | 757000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-23                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-23                     | Mn      | Water         | D     | 3100    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-23                     | Na      | Water         | D     | 6710000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-23                     | Ni      | Water         | D     | 8310    |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-23                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-23                     | Si      | Water         | D     | 10700   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-125+50-1-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-24                     | As      | Water         | TR    | 93.9    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-24                     | Cu      | Water         | TR    | 22.9    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-24                     | Hg      | Water         | TR    | 6.95    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-24                     | Ni      | Water         | TR    | 439     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-24                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-125+50-1-103117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-25                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-25                     | As      | Water         | D     | 82.6    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-25                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-25                     | As(V)   | Water         | D     | 66.5    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-25                     | Ca      | Water         | D     | 239000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-25                     | Cu      | Water         | D     | 4.60    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-25                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-25                     | Fe      | Water         | D     | 1620    |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-25                     | Hg      | Water         | D     | 5.03    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-25                     | K       | Water         | D     | 233000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-25                     | Mg      | Water         | D     | 652000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-25                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-25                     | Mn      | Water         | D     | 115     |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-25                     | Na      | Water         | D     | 5510000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-25                     | Ni      | Water         | D     | 462     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-25                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-25                     | Si      | Water         | D     | 8990    |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-126+90-0-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-26                     | As      | Water         | TR    | 31.2    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-26                     | Cu      | Water         | TR    | 11.1    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-26                     | Hg      | Water         | TR    | 3.76    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-26                     | Ni      | Water         | TR    | 320     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-26                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-126+90-0-103117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-27                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-27                     | As      | Water         | D     | 24.8    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-27                     | As(III) | Water         | D     | 0.242   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-27                     | As(V)   | Water         | D     | 22.0    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-27                     | Ca      | Water         | D     | 205000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-27                     | Cu      | Water         | D     | 6.99    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-27                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-27                     | Fe      | Water         | D     | ≤ 11.4  | U         | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-27                     | Hg      | Water         | D     | 2.34    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-27                     | K       | Water         | D     | 201000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-27                     | Mg      | Water         | D     | 538000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-27                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-27                     | Mn      | Water         | D     | 2.02    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-27                     | Na      | Water         | D     | 4750000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-27                     | Ni      | Water         | D     | 316     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-27                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-27                     | Si      | Water         | D     | 6380    |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-125+50-0-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-28                     | As      | Water         | TR    | 87.0    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-28                     | Cu      | Water         | TR    | 10.2    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-28                     | Hg      | Water         | TR    | 8.49    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-28                     | Ni      | Water         | TR    | 634     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-28                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-125+50-0-103117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-29                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-29                     | As      | Water         | D     | 74.7    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-29                     | As(III) | Water         | D     | 2.41    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-29                     | As(V)   | Water         | D     | 60.2    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-29                     | Ca      | Water         | D     | 294000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-29                     | Cu      | Water         | D     | 5.00    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-29                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-29                     | Fe      | Water         | D     | 292     |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-29                     | Hg      | Water         | D     | 4.74    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-29                     | K       | Water         | D     | 268000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-29                     | Mg      | Water         | D     | 776000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-29                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-29                     | Mn      | Water         | D     | 34.5    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-29                     | Na      | Water         | D     | 6530000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-29                     | Ni      | Water         | D     | 616     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-29                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-29                     | Si      | Water         | D     | 7440    |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-124+00-1-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-30                     | As      | Water         | TR    | 2520    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-30                     | Cu      | Water         | TR    | 9.26    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-30                     | Hg      | Water         | TR    | 17.4    |           | 0.10  | 0.41  | ng/L | B172993 | 1701378  |
| 1744028-30                     | Ni      | Water         | TR    | 61.8    |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-30                     | Pb      | Water         | TR    | 0.938   |           | 0.041 | 0.163 | µg/L | B173242 | 1701504  |





## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-124+00-1-103117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-31                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-31                     | As      | Water         | D     | 3130    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-31                     | As(III) | Water         | D     | 1840    |           | 0.400 | 2.00  | µg/L | B173027 | 1701411  |
| 1744028-31                     | As(V)   | Water         | D     | 131     |           | 0.400 | 2.00  | µg/L | B173027 | 1701411  |
| 1744028-31                     | Ca      | Water         | D     | 327000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-31                     | Cu      | Water         | D     | 3.18    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-31                     | DMAs    | Water         | D     | ≤ 0.500 | U         | 0.500 | 2.10  | µg/L | B173027 | 1701411  |
| 1744028-31                     | Fe      | Water         | D     | 3330    |           | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-31                     | Hg      | Water         | D     | 3.39    |           | 0.10  | 0.41  | ng/L | B172993 | 1701378  |
| 1744028-31                     | K       | Water         | D     | 263000  |           | 98.0  | 408   | µg/L | B173242 | 1701504  |
| 1744028-31                     | Mg      | Water         | D     | 854000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-31                     | MMAAs   | Water         | D     | ≤ 0.400 | U         | 0.400 | 2.30  | µg/L | B173027 | 1701411  |
| 1744028-31                     | Mn      | Water         | D     | 968     |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-31                     | Na      | Water         | D     | 7560000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-31                     | Ni      | Water         | D     | 65.2    |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-31                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-31                     | Si      | Water         | D     | 13100   |           | 36.7  | 163   | µg/L | B173242 | 1701504  |
| <b>GW-124+00-0-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744028-32                     | As      | Water         | TR    | 8.60    |           | 0.449 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-32                     | Cu      | Water         | TR    | 5.09    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-32                     | Hg      | Water         | TR    | 1.01    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-32                     | Ni      | Water         | TR    | 321     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-32                     | Pb      | Water         | TR    | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |





## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-124+00-0-103117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744028-33                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173242 | 1701504  |
| 1744028-33                     | As      | Water         | D     | 7.65    |           | 1.12  | 4.08  | µg/L | B173242 | 1701579  |
| 1744028-33                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-33                     | As(V)   | Water         | D     | 6.16    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744028-33                     | Ca      | Water         | D     | 338000  |           | 188   | 563   | µg/L | B173242 | 1701504  |
| 1744028-33                     | Cu      | Water         | D     | 4.34    |           | 0.898 | 2.69  | µg/L | B173242 | 1701504  |
| 1744028-33                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744028-33                     | Fe      | Water         | D     | ≤ 11.4  | U         | 11.4  | 34.7  | µg/L | B173242 | 1701504  |
| 1744028-33                     | Hg      | Water         | D     | 0.68    |           | 0.10  | 0.40  | ng/L | B172993 | 1701378  |
| 1744028-33                     | K       | Water         | D     | 275000  |           | 245   | 1020  | µg/L | B173242 | 1701552  |
| 1744028-33                     | Mg      | Water         | D     | 882000  |           | 551   | 1730  | µg/L | B173242 | 1701504  |
| 1744028-33                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744028-33                     | Mn      | Water         | D     | 5.33    |           | 0.163 | 1.63  | µg/L | B173242 | 1701504  |
| 1744028-33                     | Na      | Water         | D     | 7410000 | J-1       | 755   | 1500  | µg/L | B173242 | 1701504  |
| 1744028-33                     | Ni      | Water         | D     | 311     |           | 0.939 | 2.82  | µg/L | B173242 | 1701504  |
| 1744028-33                     | Pb      | Water         | D     | ≤ 0.041 | U         | 0.041 | 0.163 | µg/L | B173242 | 1701504  |
| 1744028-33                     | Si      | Water         | D     | 4260    |           | 36.7  | 163   | µg/L | B173242 | 1701504  |



## Accuracy & Precision Summary

Batch: B172993  
 Lab Matrix: Water  
 Method: EPA 1631 E

| Sample       | Analyte                                    | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B172993-SRM1 | Standard Reference Material (1741007, THg) |        | 15.68 | 15.53  | ng/L  | 99% 80-120   |              |
| B172993-MS1  | Matrix Spike (1744001-02)                  | 1.36   | 6.122 | 7.11   | ng/L  | 94% 71-125   |              |
| B172993-MSD1 | Matrix Spike Duplicate (1744001-02)        | 1.36   | 6.122 | 7.19   | ng/L  | 95% 71-125   | 1% 24        |
| B172993-MS2  | Matrix Spike (1744028-07)                  | 0.24   | 10.42 | 10.70  | ng/L  | 100% 71-125  |              |
| B172993-MSD2 | Matrix Spike Duplicate (1744028-07)        | 0.24   | 10.42 | 10.77  | ng/L  | 101% 71-125  | 0.7% 24      |
| B172993-MS3  | Matrix Spike (1744028-15)                  | 20.65  | 100.0 | 103.0  | ng/L  | 82% 71-125   |              |
| B172993-MSD3 | Matrix Spike Duplicate (1744028-15)        | 20.65  | 100.0 | 109.1  | ng/L  | 88% 71-125   | 6% 24        |
| B172993-MS4  | Matrix Spike (1744028-28)                  | 8.49   | 10.10 | 17.77  | ng/L  | 92% 71-125   |              |
| B172993-MSD4 | Matrix Spike Duplicate (1744028-28)        | 8.49   | 10.10 | 19.34  | ng/L  | 107% 71-125  | 8% 24        |



## Accuracy & Precision Summary

Batch: B173027  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173027-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.583  | µg/L  | 111% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 5.341  | µg/L  | 107% 75-125  |              |
|              | DMAs  |        | 3.198 | 3.198  | µg/L  | 100% 75-125  |              |
| B173027-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMAAs                                       |        | 4.634 | 4.859  | µg/L  | 105% 75-125  |              |
| B173027-DUP2 | <b>Duplicate, (1744028-02)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | As(V)                                       | 1.268  |       | 1.195  | µg/L  |              | 6% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B173027-MS2  | <b>Matrix Spike, (1744028-02)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 51.99  | µg/L  | 104% 75-125  |              |
|              | As(V)                                       | 1.268  | 50.00 | 53.60  | µg/L  | 105% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 53.54  | µg/L  | 105% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 51.15  | µg/L  | 102% 75-125  |              |
| B173027-MSD2 | <b>Matrix Spike Duplicate, (1744028-02)</b> |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 52.92  | µg/L  | 106% 75-125  | 2% 25        |
|              | As(V)                                       | 1.268  | 50.00 | 53.45  | µg/L  | 104% 75-125  | 0.3% 25      |
|              | DMAs  | ND     | 51.00 | 55.34  | µg/L  | 109% 75-125  | 3% 25        |
|              | MMAAs                                       | ND     | 50.00 | 51.96  | µg/L  | 104% 75-125  | 2% 25        |
| B173027-DUP8 | <b>Duplicate, (1744028-21)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 0.220  |       | 0.230  | µg/L  |              | 4% 25        |
|              | As(V)                                       | 0.905  |       | 0.836  | µg/L  |              | 8% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B173027-MS8  | <b>Matrix Spike, (1744028-21)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 0.220  | 50.00 | 51.47  | µg/L  | 103% 75-125  |              |
|              | As(V)                                       | 0.905  | 50.00 | 55.44  | µg/L  | 109% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 58.27  | µg/L  | 114% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 54.46  | µg/L  | 109% 75-125  |              |



## Accuracy & Precision Summary

Batch: B173027  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173027-MSD8</b> | <b>Matrix Spike Duplicate, (1744028-21)</b> |        |       |        |       |              |              |
|                     | As(III)                                     | 0.220  | 50.00 | 50.62  | µg/L  | 101% 75-125  | 2% 25        |
|                     | As(V)                                       | 0.905  | 50.00 | 56.57  | µg/L  | 111% 75-125  | 2% 25        |
|                     | DMAs  | ND     | 51.00 | 57.77  | µg/L  | 113% 75-125  | 0.9% 25      |
|                     | MMAAs                                       | ND     | 50.00 | 54.77  | µg/L  | 110% 75-125  | 0.6% 25      |
| <b>B173027-DUP3</b> | <b>Duplicate, (1744050-02)</b>              |        |       |        |       |              |              |
|                     | As(III)                                     | 4.150  |       | 4.317  | µg/L  |              | 4% 25        |
|                     | As(V)                                       | 0.456  |       | 0.454  | µg/L  |              | 0.5% 25      |
|                     | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|                     | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| <b>B173027-MS3</b>  | <b>Matrix Spike, (1744050-02)</b>           |        |       |        |       |              |              |
|                     | As(III)                                     | 4.150  | 50.00 | 52.80  | µg/L  | 97% 75-125   |              |
|                     | As(V)                                       | 0.456  | 50.00 | 52.13  | µg/L  | 103% 75-125  |              |
|                     | DMAs  | ND     | 51.00 | 52.37  | µg/L  | 103% 75-125  |              |
|                     | MMAAs                                       | ND     | 50.00 | 50.21  | µg/L  | 100% 75-125  |              |
| <b>B173027-MSD3</b> | <b>Matrix Spike Duplicate, (1744050-02)</b> |        |       |        |       |              |              |
|                     | As(III)                                     | 4.150  | 50.00 | 53.13  | µg/L  | 98% 75-125   | 0.6% 25      |
|                     | As(V)                                       | 0.456  | 50.00 | 52.30  | µg/L  | 104% 75-125  | 0.3% 25      |
|                     | DMAs  | ND     | 51.00 | 52.12  | µg/L  | 102% 75-125  | 0.5% 25      |
|                     | MMAAs                                       | ND     | 50.00 | 50.39  | µg/L  | 101% 75-125  | 0.4% 25      |
| <b>B173027-DUP4</b> | <b>Duplicate, (1744050-11)</b>              |        |       |        |       |              |              |
|                     | As(III)                                     | ND     |       | ND     | µg/L  |              | N/C 25       |
|                     | As(V)                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
|                     | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|                     | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| <b>B173027-MS4</b>  | <b>Matrix Spike, (1744050-11)</b>           |        |       |        |       |              |              |
|                     | As(III)                                     | ND     | 50.00 | 49.52  | µg/L  | 99% 75-125   |              |
|                     | As(V)                                       | ND     | 50.00 | 50.05  | µg/L  | 100% 75-125  |              |
|                     | DMAs  | ND     | 51.00 | 51.95  | µg/L  | 102% 75-125  |              |
|                     | MMAAs                                       | ND     | 50.00 | 49.48  | µg/L  | 99% 75-125   |              |



## Accuracy & Precision Summary

Batch: B173027  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173027-MSD4</b> | <b>Matrix Spike Duplicate, (1744050-11)</b> |        |       |        |       |              |              |
|                     | As(III)                                     | ND     | 50.00 | 49.22  | µg/L  | 98% 75-125   | 0.6% 25      |
|                     | As(V)                                       | ND     | 50.00 | 51.66  | µg/L  | 103% 75-125  | 3% 25        |
|                     | DMAs  | ND     | 51.00 | 52.25  | µg/L  | 102% 75-125  | 0.6% 25      |
|                     | MMAAs                                       | ND     | 50.00 | 50.81  | µg/L  | 102% 75-125  | 3% 25        |
| <b>B173027-DUP5</b> | <b>Duplicate, (1744050-17)</b>              |        |       |        |       |              |              |
|                     | As(III)                                     | 142.1  |       | 140.9  | µg/L  |              | 0.8% 25      |
|                     | As(V)                                       | 66.53  |       | 65.64  | µg/L  |              | 1% 25        |
|                     | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|                     | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| <b>B173027-MS5</b>  | <b>Matrix Spike, (1744050-17)</b>           |        |       |        |       |              |              |
|                     | As(III)                                     | 142.1  | 50.00 | 192.6  | µg/L  | 101% 75-125  |              |
|                     | As(V)                                       | 66.53  | 50.00 | 114.9  | µg/L  | 97% 75-125   |              |
|                     | DMAs  | ND     | 51.00 | 49.05  | µg/L  | 96% 75-125   |              |
|                     | MMAAs                                       | ND     | 50.00 | 48.00  | µg/L  | 96% 75-125   |              |
| <b>B173027-MSD5</b> | <b>Matrix Spike Duplicate, (1744050-17)</b> |        |       |        |       |              |              |
|                     | As(III)                                     | 142.1  | 50.00 | 191.6  | µg/L  | 99% 75-125   | 0.6% 25      |
|                     | As(V)                                       | 66.53  | 50.00 | 115.2  | µg/L  | 97% 75-125   | 0.3% 25      |
|                     | DMAs  | ND     | 51.00 | 48.75  | µg/L  | 96% 75-125   | 0.6% 25      |
|                     | MMAAs                                       | ND     | 50.00 | 47.77  | µg/L  | 96% 75-125   | 0.5% 25      |
| <b>B173027-DUP1</b> | <b>Duplicate, (1744060-01)</b>              |        |       |        |       |              |              |
|                     | As(III)                                     | 0.271  |       | 0.277  | µg/L  |              | 2% 25        |
|                     | As(V)                                       | 0.520  |       | 0.512  | µg/L  |              | 2% 25        |
|                     | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|                     | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| <b>B173027-MS1</b>  | <b>Matrix Spike, (1744060-01)</b>           |        |       |        |       |              |              |
|                     | As(III)                                     | 0.271  | 25.00 | 26.88  | µg/L  | 106% 75-125  |              |
|                     | As(V)                                       | 0.520  | 25.00 | 26.87  | µg/L  | 105% 75-125  |              |
|                     | DMAs  | ND     | 25.50 | 27.75  | µg/L  | 109% 75-125  |              |
|                     | MMAAs                                       | ND     | 25.00 | 26.41  | µg/L  | 106% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173027  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173027-MSD1</b> | <b>Matrix Spike Duplicate, (1744060-01)</b> |        |       |        |       |              |              |
|                     | As(III)                                     | 0.271  | 25.00 | 27.36  | µg/L  | 108% 75-125  | 2% 25        |
|                     | As(V)                                       | 0.520  | 25.00 | 27.16  | µg/L  | 107% 75-125  | 1% 25        |
|                     | DMAs  | ND     | 25.50 | 27.47  | µg/L  | 108% 75-125  | 1% 25        |
|                     | MMAs  | ND     | 25.00 | 26.33  | µg/L  | 105% 75-125  | 0.3% 25      |



## Accuracy & Precision Summary

Batch: B173242  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample      | Analyte                | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|------------------------|--------|-------|--------|-------|--------------|--------------|
| B173242-BS1 | Blank Spike, (1738012) |        |       |        |       |              |              |
|             |                        | Al     |       | 400.0  | 349.2 | µg/L         | 87% 75-125   |
|             |                        | As     |       | 20.00  | 20.64 | µg/L         | 103% 75-125  |
|             |                        | Ca     |       | 400.0  | 374.1 | µg/L         | 94% 75-125   |
|             |                        | Cu     |       | 20.00  | 20.54 | µg/L         | 103% 75-125  |
|             |                        | Fe     |       | 400.0  | 394.1 | µg/L         | 99% 75-125   |
|             |                        | K      |       | 400.0  | 390.7 | µg/L         | 98% 75-125   |
|             |                        | Mg     |       | 400.0  | 366.7 | µg/L         | 92% 75-125   |
|             |                        | Mn     |       | 20.00  | 19.64 | µg/L         | 98% 75-125   |
|             |                        | Na     |       | 400.0  | 679.7 | µg/L         | 170% 75-125  |
|             |                        | Ni     |       | 20.00  | 20.95 | µg/L         | 105% 75-125  |
|             |                        | Pb     |       | 2.000  | 2.078 | µg/L         | 104% 75-125  |
|             |                        | Si     |       | 200.0  | 210.9 | µg/L         | 105% 75-125  |
| B173242-BS2 | Blank Spike, (1738012) |        |       |        |       |              |              |
|             |                        | Al     |       | 400.0  | 354.4 | µg/L         | 89% 75-125   |
|             |                        | As     |       | 20.00  | 19.63 | µg/L         | 98% 75-125   |
|             |                        | Ca     |       | 400.0  | 376.7 | µg/L         | 94% 75-125   |
|             |                        | Cu     |       | 20.00  | 19.54 | µg/L         | 98% 75-125   |
|             |                        | Fe     |       | 400.0  | 373.1 | µg/L         | 93% 75-125   |
|             |                        | K      |       | 400.0  | 388.9 | µg/L         | 97% 75-125   |
|             |                        | Mg     |       | 400.0  | 371.6 | µg/L         | 93% 75-125   |
|             |                        | Mn     |       | 20.00  | 19.91 | µg/L         | 100% 75-125  |
|             |                        | Na     |       | 400.0  | 684.5 | µg/L         | 171% 75-125  |
|             |                        | Ni     |       | 20.00  | 20.40 | µg/L         | 102% 75-125  |
|             |                        | Pb     |       | 2.000  | 1.955 | µg/L         | 98% 75-125   |
|             |                        | Si     |       | 200.0  | 211.8 | µg/L         | 106% 75-125  |



## Accuracy & Precision Summary

Batch: B173242  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte  | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|---------------------|--|--------|--------|--------|-------|--------------|--------------|
| <b>B173242-SRM1</b> | <b>Standard Reference Material (1724009, T221 as SRM)</b>            |        |        |        |       |              |              |
|                     | Al   |        | 374.0  | 344.1  | µg/L  | 92% 75-125   |              |
|                     | As   |        | 17.70  | 18.45  | µg/L  | 104% 75-125  |              |
|                     | Ca   | 16700  |        | 15820  | µg/L  | 95% 75-125   |              |
|                     | Cu   |        | 3.780  | 4.008  | µg/L  | 106% 75-125  |              |
|                     | Fe   |        | 328.0  | 321.8  | µg/L  | 98% 75-125   |              |
|                     | K  |        | 1900   | 1895   | µg/L  | 100% 75-125  |              |
|                     | Mg   |        | 3770   | 3501   | µg/L  | 93% 75-125   |              |
|                     | Mn   |        | 33.60  | 33.00  | µg/L  | 98% 75-125   |              |
|                     | Na   | 17400  |        | 16430  | µg/L  | 94% 75-125   |              |
|                     | Ni   |        | 0.6000 | 4.258  | µg/L  | 710% 75-125  |              |
|                     | Pb   |        | 0.4900 | 0.515  | µg/L  | 105% 75-125  |              |
|                     | Si   |        | 5843   | 6546   | µg/L  | 112% 75-125  |              |
| <b>B173242-SRM2</b> | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |        |        |        |       |              |              |
|                     | Al   |        | 53.00  | 47.59  | µg/L  | 90% 75-125   |              |
|                     | As   |        | 8.075  | 8.573  | µg/L  | 106% 75-125  |              |
|                     | Ca   | 5615   |        | 5128   | µg/L  | 91% N/A      |              |
|                     | Cu   |        | 85.75  | 93.15  | µg/L  | 109% 75-125  |              |
|                     | Fe   |        | 36.80  | 39.34  | µg/L  | 107% 75-125  |              |
|                     | K  |        | 579.9  | 582.3  | µg/L  | 100% 0-200   |              |
|                     | Mg   |        | 1059   | 961.5  | µg/L  | 91% N/A      |              |
|                     | Mn   |        | 40.39  | 38.43  | µg/L  | 95% 75-125   |              |
|                     | Na   | 3137   |        | 2926   | µg/L  | 93% N/A      |              |
|                     | Ni   |        | 25.32  | 26.71  | µg/L  | 106% 75-125  |              |
|                     | Pb   |        | 12.10  | 13.37  | µg/L  | 110% 75-125  |              |
|                     | Si   |        | 5210   | 5509   | µg/L  | 106% N/A     |              |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173242  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample              | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B173242-DUP3</b> | <b>Duplicate, (1744007-10)</b> |        |       |        |       |              |              |
|                     | Cu                             | 18.96  |       | 18.05  | µg/L  |              | 5% 20        |
|                     | Ni                             | 23.11  |       | 23.24  | µg/L  |              | 0.6% 20      |
|                     | Pb                             | 2.630  |       | 2.584  | µg/L  |              | 2% 20        |



## Accuracy & Precision Summary

Batch: B173242  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173242-MS3</b>  | <b>Matrix Spike, (1744007-10)</b>           |        |       |        |       |              |              |
|                     | Cu  | 18.96  | 408.2 | 444.5  | µg/L  | 104% 75-125  |              |
|                     | Ni  | 23.11  | 408.2 | 443.9  | µg/L  | 103% 75-125  |              |
|                     | Pb  | 2.630  | 40.82 | 45.85  | µg/L  | 106% 75-125  |              |
| <b>B173242-MSD3</b> | <b>Matrix Spike Duplicate, (1744007-10)</b> |        |       |        |       |              |              |
|                     | Cu  | 18.96  | 408.2 | 439.3  | µg/L  | 103% 75-125  | 1% 20        |
|                     | Ni  | 23.11  | 408.2 | 437.4  | µg/L  | 102% 75-125  | 1% 20        |
|                     | Pb  | 2.630  | 40.82 | 45.56  | µg/L  | 105% 75-125  | 0.6% 20      |
| <b>B173242-DUP4</b> | <b>Duplicate, (1744028-07)</b>              |        |       |        |       |              |              |
|                     | Al  | ND     |       | ND     | µg/L  |              | N/C 20       |
|                     | Ca  | 228900 |       | 236100 | µg/L  |              | 3% 20        |
|                     | Fe  | 27.84  |       | 28.49  | µg/L  |              | 2% 20        |
|                     | K   | 186000 |       | 190000 | µg/L  |              | 2% 20        |
|                     | Mn  | 17.99  |       | 18.48  | µg/L  |              | 3% 20        |
|                     | Ni  | 1.027  |       | 1.103  | µg/L  |              | 7% 20        |
|                     | Pb  | ND     |       | ND     | µg/L  |              | N/C 20       |
| Si                  | 22590                                       |        | 23050 | µg/L   |       | 2% 20        |              |
| <b>B173242-DUP7</b> | <b>Duplicate, (1744028-07)</b>              |        |       |        |       |              |              |
|                     | Cu  | ND     |       | ND     | µg/L  |              | N/C 20       |
| <b>B173242-DUPB</b> | <b>Duplicate, (1744028-07)</b>              |        |       |        |       |              |              |
|                     | As  | 4.230  |       | 4.228  | µg/L  |              | 0.04% 20     |
| <b>B173242-MS4</b>  | <b>Matrix Spike, (1744028-07)</b>           |        |       |        |       |              |              |
|                     | Al  | ND     | 4082  | 4256   | µg/L  | 104% 75-125  |              |
|                     | Ca  | 228900 | 4082  | 235400 | µg/L  | NR 75-125    |              |
|                     | Fe  | 27.84  | 4082  | 4099   | µg/L  | 100% 75-125  |              |
|                     | K   | 186000 | 4082  | 192000 | µg/L  | NR 75-125    |              |
|                     | Mn  | 17.99  | 408.2 | 452.6  | µg/L  | 106% 75-125  |              |
|                     | Ni  | 1.027  | 408.2 | 428.9  | µg/L  | 105% 75-125  |              |
|                     | Pb  | ND     | 40.82 | 38.86  | µg/L  | 95% 75-125   |              |
|                     | Si  | 22590  | 40820 | 72980  | µg/L  | 123% 75-125  |              |



## Accuracy & Precision Summary

**Batch:** B173242  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample              | Analyte                                     | Native  | Spike | Result  | Units | REC & Limits | RPD & Limits |
|---------------------|---|---------|-------|---------|-------|--------------|--------------|
| <b>B173242-MS7</b>  | <b>Matrix Spike, (1744028-07)</b>           |         |       |         |       |              |              |
|                     | Cu  | ND      | 1020  | 1087    | µg/L  | 107% 75-125  |              |
| <b>B173242-MSB</b>  | <b>Matrix Spike, (1744028-07)</b>           |         |       |         |       |              |              |
|                     | As  | 4.230   | 1020  | 1030    | µg/L  | 101% 75-125  |              |
| <b>B173242-MSD4</b> | <b>Matrix Spike Duplicate, (1744028-07)</b> |         |       |         |       |              |              |
|                     | Al  | ND      | 4082  | 4401    | µg/L  | 108% 75-125  | 3% 20        |
|                     | Ca  | 228900  | 4082  | 243700  | µg/L  | NR 75-125    | N/C 20       |
|                     | Fe  | 27.84   | 4082  | 4132    | µg/L  | 101% 75-125  | 0.8% 20      |
|                     | K   | 186000  | 4082  | 194000  | µg/L  | NR 75-125    | N/C 20       |
|                     | Mn  | 17.99   | 408.2 | 455.4   | µg/L  | 107% 75-125  | 0.6% 20      |
|                     | Ni  | 1.027   | 408.2 | 441.7   | µg/L  | 108% 75-125  | 3% 20        |
|                     | Pb  | ND      | 40.82 | 38.86   | µg/L  | 95% 75-125   | 0.005% 20    |
|                     | Si  | 22590   | 40820 | 74100   | µg/L  | 126% 75-125  | 2% 20        |
| <b>B173242-MSD7</b> | <b>Matrix Spike Duplicate, (1744028-07)</b> |         |       |         |       |              |              |
|                     | Cu  | ND      | 1020  | 1100    | µg/L  | 108% 75-125  | 1% 20        |
| <b>B173242-MSDB</b> | <b>Matrix Spike Duplicate, (1744028-07)</b> |         |       |         |       |              |              |
|                     | As  | 4.230   | 1020  | 1025    | µg/L  | 100% 75-125  | 0.5% 20      |
| <b>B173242-DUPC</b> | <b>Duplicate, (1744028-08)</b>              |         |       |         |       |              |              |
|                     | As  | 3.848   |       | 3.672   | µg/L  |              | 5% 20        |
| <b>B173242-MSC</b>  | <b>Matrix Spike, (1744028-08)</b>           |         |       |         |       |              |              |
|                     | As  | 3.848   | 1020  | 1234    | µg/L  | 121% 75-125  |              |
| <b>B173242-MSDC</b> | <b>Matrix Spike Duplicate, (1744028-08)</b> |         |       |         |       |              |              |
|                     | As  | 3.848   | 1020  | 1226    | µg/L  | 120% 75-125  | 0.6% 20      |
| <b>B173242-DUPA</b> | <b>Duplicate, (1744028-12)</b>              |         |       |         |       |              |              |
|                     | K   | 251800  |       | 258200  | µg/L  |              | 3% 20        |
|                     | Mg  | 886300  |       | 890600  | µg/L  |              | 0.5% 20      |
|                     | Na  | 7017000 |       | 7086000 | µg/L  |              | 1% 20        |



## Accuracy & Precision Summary

Batch: B173242  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native  | Spike  | Result  | Units | REC & Limits | RPD & Limits |
|---------------------|---|---------|--------|---------|-------|--------------|--------------|
| <b>B173242-MSA</b>  | <b>Matrix Spike, (1744028-12)</b>           |         |        |         |       |              |              |
|                     | K   | 251800  | 102000 | 352600  | µg/L  | 99% 75-125   |              |
|                     | Mg  | 886300  | 102000 | 975300  | µg/L  | NR 75-125    |              |
|                     | Na  | 7017000 | 102000 | 7063000 | µg/L  | NR 75-125    |              |
| <b>B173242-MSDA</b> | <b>Matrix Spike Duplicate, (1744028-12)</b> |         |        |         |       |              |              |
|                     | K   | 251800  | 102000 | 356100  | µg/L  | 102% 75-125  | 1% 20        |
|                     | Mg  | 886300  | 102000 | 982000  | µg/L  | NR 75-125    | N/C 20       |
|                     | Na  | 7017000 | 102000 | 7111000 | µg/L  | NR 75-125    | N/C 20       |
| <b>B173242-DUP5</b> | <b>Duplicate, (1744028-20)</b>              |         |        |         |       |              |              |
|                     | Al  | 271.0   |        | 271.2   | µg/L  |              | 0.08% 20     |
|                     | As  | 250.1   |        | 255.6   | µg/L  |              | 2% 20        |
|                     | Ca  | 202800  |        | 200600  | µg/L  |              | 1% 20        |
|                     | Cu  | 689.2   |        | 705.9   | µg/L  |              | 2% 20        |
|                     | Fe  | 106800  |        | 108300  | µg/L  |              | 1% 20        |
|                     | K   | 199200  |        | 198400  | µg/L  |              | 0.4% 20      |
|                     | Mn  | 706.4   |        | 698.1   | µg/L  |              | 1% 20        |
|                     | Ni  | 998.5   |        | 1014    | µg/L  |              | 2% 20        |
|                     | Pb  | 0.227   |        | 0.229   | µg/L  |              | 0.7% 20      |
|                     | Si  | 17190   |        | 16910   | µg/L  |              | 2% 20        |
| <b>B173242-MS5</b>  | <b>Matrix Spike, (1744028-20)</b>           |         |        |         |       |              |              |
|                     | Al  | 271.0   | 4082   | 4496    | µg/L  | 104% 75-125  |              |
|                     | As  | 250.1   | 408.2  | 701.3   | µg/L  | 111% 75-125  |              |
|                     | Ca  | 202800  | 4082   | 203300  | µg/L  | NR 75-125    |              |
|                     | Cu  | 689.2   | 408.2  | 1128    | µg/L  | 108% 75-125  |              |
|                     | Fe  | 106800  | 4082   | 112100  | µg/L  | NR 75-125    |              |
|                     | K   | 199200  | 4082   | 198900  | µg/L  | NR 75-125    |              |
|                     | Mn  | 706.4   | 408.2  | 1154    | µg/L  | 110% 75-125  |              |
|                     | Ni  | 998.5   | 408.2  | 1416    | µg/L  | 102% 75-125  |              |
|                     | Pb  | 0.227   | 40.82  | 39.65   | µg/L  | 97% 75-125   |              |
|                     | Si  | 17190   | 40820  | 64940   | µg/L  | 117% 75-125  |              |

Project ID: PTC-OA1701  
PM: Jeremy Maute



Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

Batch: B173242

Lab Matrix: Water

Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173242-MSD5</b> | <b>Matrix Spike Duplicate, (1744028-20)</b> |        |       |        |       |              |              |
|                     | Al  | 271.0  | 4082  | 4597   | µg/L  | 106% 75-125  | 2% 20        |
|                     | As  | 250.1  | 408.2 | 705.7  | µg/L  | 112% 75-125  | 0.6% 20      |
|                     | Ca  | 202800 | 4082  | 205100 | µg/L  | NR 75-125    | N/C 20       |
|                     | Cu  | 689.2  | 408.2 | 1131   | µg/L  | 108% 75-125  | 0.2% 20      |
|                     | Fe  | 106800 | 4082  | 111600 | µg/L  | NR 75-125    | N/C 20       |
|                     | K   | 199200 | 4082  | 201600 | µg/L  | NR 75-125    | N/C 20       |
|                     | Mn  | 706.4  | 408.2 | 1166   | µg/L  | 113% 75-125  | 1% 20        |
|                     | Ni  | 998.5  | 408.2 | 1449   | µg/L  | 110% 75-125  | 2% 20        |
|                     | Pb  | 0.227  | 40.82 | 39.81  | µg/L  | 97% 75-125   | 0.4% 20      |
|                     | Si  | 17190  | 40820 | 66540  | µg/L  | 121% 75-125  | 2% 20        |
| <b>B173242-DUP6</b> | <b>Duplicate, (1744028-32)</b>              |        |       |        |       |              |              |
|                     | Al  | ND     |       | ND     | µg/L  |              | N/C 20       |
|                     | As  | 8.597  |       | 8.966  | µg/L  |              | 4% 20        |
|                     | Ca  | 334200 |       | 328900 | µg/L  |              | 2% 20        |
|                     | Cu  | 5.087  |       | 5.711  | µg/L  |              | 12% 20       |
|                     | Fe  | 38.22  |       | 38.35  | µg/L  |              | 0.3% 20      |
|                     | K   | 305600 |       | 305100 | µg/L  |              | 0.2% 20      |
|                     | Mn  | 3.946  |       | 3.847  | µg/L  |              | 3% 20        |
|                     | Ni  | 320.5  |       | 314.4  | µg/L  |              | 2% 20        |
|                     | Pb  | ND     |       | ND     | µg/L  |              | N/C 20       |
|                     | Si  | 4063   |       | 4263   | µg/L  |              | 5% 20        |
| <b>B173242-MS6</b>  | <b>Matrix Spike, (1744028-32)</b>           |        |       |        |       |              |              |
|                     | Al  | ND     | 4082  | 4894   | µg/L  | 120% 75-125  |              |
|                     | As  | 8.597  | 408.2 | 475.9  | µg/L  | 114% 75-125  |              |
|                     | Ca  | 334200 | 4082  | 335500 | µg/L  | NR 75-125    |              |
|                     | Cu  | 5.087  | 408.2 | 454.2  | µg/L  | 110% 75-125  |              |
|                     | Fe  | 38.22  | 4082  | 4358   | µg/L  | 106% 75-125  |              |
|                     | K   | 305600 | 4082  | 308600 | µg/L  | NR 75-125    |              |
|                     | Mn  | 3.946  | 408.2 | 454.7  | µg/L  | 110% 75-125  |              |
|                     | Ni  | 320.5  | 408.2 | 750.3  | µg/L  | 105% 75-125  |              |
|                     | Pb  | ND     | 40.82 | 38.12  | µg/L  | 93% 75-125   |              |
|                     | Si  | 4063   | 40820 | 59970  | µg/L  | 137% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173242

**Lab Matrix:** Water

**Method:** EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|--------|--------|-------|--------------|--------------|
| <b>B173242-MSD6</b> | <b>Matrix Spike Duplicate, (1744028-32)</b> |        |        |        |       |              |              |
|                     | Al  | ND     | 4082   | 4916   | µg/L  | 20% 75-125   | 0.5% 20      |
|                     | As  | 8.597  | 408.2  | 478.0  | µg/L  | 115% 75-125  | 0.4% 20      |
|                     | Ca  | 334200 | 4082   | 335700 | µg/L  | NR 75-125    | N/C 20       |
|                     | Cu  | 5.087  | 408.2  | 451.0  | µg/L  | 109% 75-125  | 0.7% 20      |
|                     | Fe  | 38.22  | 4082   | 4356   | µg/L  | 106% 75-125  | 0.05% 20     |
|                     | K   | 305600 | 4082   | 308900 | µg/L  | NR 75-125    | N/C 20       |
|                     | Mn  | 3.946  | 408.2  | 458.0  | µg/L  | 111% 75-125  | 0.7% 20      |
|                     | Ni  | 320.5  | 408.2  | 743.4  | µg/L  | 104% 75-125  | 0.9% 20      |
|                     | Pb  | ND     | 40.82  | 37.98  | µg/L  | 93% 75-125   | 0.4% 20      |
|                     | Si  | 4063   | 40820  | 59310  | µg/L  | 135% 75-125  | 1% 20        |
| <b>B173242-DUP2</b> | <b>Duplicate, (1744028-33)</b>              |        |        |        |       |              |              |
|                     | Mg  | 882100 |        | 881300 | µg/L  |              | 0.09% 20     |
| <b>B173242-MS2</b>  | <b>Matrix Spike, (1744028-33)</b>           |        |        |        |       |              |              |
|                     | Mg  | 882100 | 102000 | 961400 | µg/L  | NR 75-125    |              |
| <b>B173242-MSD2</b> | <b>Matrix Spike Duplicate, (1744028-33)</b> |        |        |        |       |              |              |
|                     | Mg  | 882100 | 102000 | 982100 | µg/L  | NR 75-125    | N/C 20       |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data  
Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B172993  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample       | Result               | Units |                                 |                  |
|--------------|----------------------|-------|---------------------------------|------------------|
| B172993-BLK1 | 0.16                 | ng/L  |                                 |                  |
| B172993-BLK2 | 0.10                 | ng/L  |                                 |                  |
| B172993-BLK3 | 0.07                 | ng/L  |                                 |                  |
| B172993-BLK4 | 0.06                 | ng/L  |                                 |                  |
|              | <b>Average:</b> 0.10 |       | <b>Standard Deviation:</b> 0.05 | <b>MDL:</b> 0.10 |
|              | <b>Limit:</b> 0.50   |       | <b>Limit:</b> 0.10              | <b>MRL:</b> 0.40 |



## Method Blanks & Reporting Limits

**Batch:** B173027  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** DMA5

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data  
Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B173027-BLK1    | 0.00          | µg/L         |                   |
| B173027-BLK2    | 0.00          | µg/L         |                   |
| B173027-BLK3    | 0.00          | µg/L         |                   |
| B173027-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL:</b> 0.023 |



## Method Blanks & Reporting Limits

**Batch:** B173242  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Al

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173242-BLK1    | -0.043        | µg/L  |                   |
| B173242-BLK2    | -0.048        | µg/L  |                   |
| B173242-BLK3    | -0.033        | µg/L  |                   |
| B173242-BLK4    | -0.038        | µg/L  |                   |
| <b>Average:</b> | <b>-0.040</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>2.000</b>  |       | <b>MRL: 2.00</b>  |

**Analyte:** As

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173242-BLK1    | -0.002        | µg/L  |                   |
| B173242-BLK2    | -0.002        | µg/L  |                   |
| B173242-BLK3    | -0.0004       | µg/L  |                   |
| B173242-BLK4    | 0.0005        | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.011</b> |
| <b>Limit:</b>   | <b>0.040</b>  |       | <b>MRL: 0.040</b> |

**Analyte:** Ca

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B173242-BLK1    | -0.097        | µg/L  |                  |
| B173242-BLK2    | -0.103        | µg/L  |                  |
| B173242-BLK3    | -0.059        | µg/L  |                  |
| B173242-BLK4    | -0.007        | µg/L  |                  |
| <b>Average:</b> | <b>-0.067</b> |       | <b>MDL: 4.60</b> |
| <b>Limit:</b>   | <b>13.800</b> |       | <b>MRL: 13.8</b> |



## Method Blanks & Reporting Limits

### Analyte: Cu

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173242-BLK1    | 0.006        | µg/L  |                   |
| B173242-BLK2    | 0.004        | µg/L  |                   |
| B173242-BLK3    | 0.005        | µg/L  |                   |
| B173242-BLK4    | 0.004        | µg/L  |                   |
| <b>Average:</b> | <b>0.005</b> |       | <b>MDL:</b> 0.022 |
| <b>Limit:</b>   | <b>0.066</b> |       | <b>MRL:</b> 0.066 |

### Analyte: Fe

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173242-BLK1    | 0.03        | µg/L  |                  |
| B173242-BLK2    | 0.01        | µg/L  |                  |
| B173242-BLK3    | 0.11        | µg/L  |                  |
| B173242-BLK4    | -0.03       | µg/L  |                  |
| <b>Average:</b> | <b>0.03</b> |       | <b>MDL:</b> 0.28 |
| <b>Limit:</b>   | <b>0.85</b> |       | <b>MRL:</b> 0.85 |

### Analyte: K

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173242-BLK1    | -0.09       | µg/L  |                  |
| B173242-BLK2    | -0.07       | µg/L  |                  |
| B173242-BLK3    | -0.04       | µg/L  |                  |
| B173242-BLK4    | -0.04       | µg/L  |                  |
| <b>Average:</b> | <b>-0.1</b> |       | <b>MDL:</b> 2.4  |
| <b>Limit:</b>   | <b>10.0</b> |       | <b>MRL:</b> 10.0 |

### Analyte: Mg

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B173242-BLK1    | -0.04        | µg/L  |                  |
| B173242-BLK2    | -0.04        | µg/L  |                  |
| B173242-BLK3    | -0.03        | µg/L  |                  |
| B173242-BLK4    | -0.03        | µg/L  |                  |
| <b>Average:</b> | <b>-0.04</b> |       | <b>MDL:</b> 0.54 |
| <b>Limit:</b>   | <b>1.70</b>  |       | <b>MRL:</b> 1.70 |



## Method Blanks & Reporting Limits

### Analyte: Mn

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173242-BLK1    | -0.0001      | µg/L  |                   |
| B173242-BLK2    | -0.0009      | µg/L  |                   |
| B173242-BLK3    | -0.0005      | µg/L  |                   |
| B173242-BLK4    | -0.0004      | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.040</b> |       | <b>MRL: 0.040</b> |

### Analyte: Na

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173242-BLK1    | -0.347        | µg/L  |                   |
| B173242-BLK2    | -0.316        | µg/L  |                   |
| B173242-BLK3    | 0.048         | µg/L  |                   |
| B173242-BLK4    | -0.165        | µg/L  |                   |
| <b>Average:</b> | <b>-0.195</b> |       | <b>MDL: 0.740</b> |
| <b>Limit:</b>   | <b>1.470</b>  |       | <b>MRL: 1.47</b>  |

### Analyte: Ni

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173242-BLK1    | 0.009        | µg/L  |                   |
| B173242-BLK2    | 0.004        | µg/L  |                   |
| B173242-BLK3    | 0.002        | µg/L  |                   |
| B173242-BLK4    | 0.002        | µg/L  |                   |
| <b>Average:</b> | <b>0.004</b> |       | <b>MDL: 0.023</b> |
| <b>Limit:</b>   | <b>0.069</b> |       | <b>MRL: 0.069</b> |

### Analyte: Pb

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173242-BLK1    | -0.0005       | µg/L  |                   |
| B173242-BLK2    | -0.001        | µg/L  |                   |
| B173242-BLK3    | -0.0009       | µg/L  |                   |
| B173242-BLK4    | -0.0009       | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.001</b> |
| <b>Limit:</b>   | <b>0.004</b>  |       | <b>MRL: 0.004</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data  
Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B173242-BLK1    | -0.11         | µg/L         |                  |
| B173242-BLK2    | -0.51         | µg/L         |                  |
| B173242-BLK3    | -0.06         | µg/L         |                  |
| B173242-BLK4    | -0.35         | µg/L         |                  |
| <b>Average:</b> | <b>-0.26</b>  |              | <b>MDL: 0.90</b> |
| <b>Limit:</b>   | <b>4.00</b>   |              | <b>MRL: 4.00</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-01              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-129+65-0-103017      |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                      | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |
| <b>Lab ID:</b> 1744028-02              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
| <b>Sample:</b> GW-129+65-0-103017-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |
| <b>Lab ID:</b> 1744028-03              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
| <b>Sample:</b> GW-128+30-0-103017      |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                      | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
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**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-04              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-128+30-0-103017-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-05         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-128+30-2-103017 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

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**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-06              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-128+30-2-103017-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-07         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-129+65-2-103017 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |



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## Sample Containers

| <b>Lab ID:</b> 1744028-08              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-129+65-2-103017-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-09         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/27/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-131+00-2-102717 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
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## Sample Containers

| <b>Lab ID:</b> 1744028-10              |                         |             | <b>Report Matrix:</b> Water |                      |              | <b>Collected:</b> 10/27/2017 |                     |
|--|-------------------------|-------------|-----------------------------|----------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-131+00-2-102717-(20) |                         |             | <b>Sample Type:</b> Sample  |                      |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>  | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)            | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)            | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                 | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 1% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-11         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-126+90-2-103017 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-12              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-126+90-2-103017-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-13         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-125+50-2-103017 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-14              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/30/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-125+50-2-103017-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-15         |                         |             | <b>Report Matrix:</b> Water |                      |              | <b>Collected:</b> 10/30/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|----------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-124+00-2-103017 |                         |             | <b>Sample Type:</b> Sample  |                      |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>  | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                 | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 1% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



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**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-16              |                         |             | <b>Report Matrix:</b> Water |                      |              | <b>Collected:</b> 10/30/2017 |                     |
|--|-------------------------|-------------|-----------------------------|----------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-124+00-2-103017-(20) |                         |             | <b>Sample Type:</b> Sample  |                      |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>  | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)            | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)            | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                 | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 1% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-17         |                         |             | <b>Report Matrix:</b> Water |                      |              | <b>Collected:</b> 10/30/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|----------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-121+80-2-103017 |                         |             | <b>Sample Type:</b> Sample  |                      |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>  | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                 | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 1% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-18              |                         |             | <b>Report Matrix:</b> Water |                      |              | <b>Collected:</b> 10/30/2017 |                     |
|--|-------------------------|-------------|-----------------------------|----------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-121+80-2-103017-(20) |                         |             | <b>Sample Type:</b> Sample  |                      |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>  | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)            | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)            | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                 | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 1% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-19           |                  |             | <b>Report Matrix:</b> Water |                     |              | <b>Collected:</b> 10/30/2017 |                     |
|-------------------------------------|------------------|-------------|-----------------------------|---------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-6E3-2-103017-(20) |                  |             | <b>Sample Type:</b> Sample  |                     |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                   | Vacutainer       | 15mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler #1 - 1744028 |
| B                                   | EXTRA_VOL        | 15mL        | 16-0257                     | EDTA (PP)           | n/a          |                              | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-20         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-129+65-1-103117 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-21              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-129+65-1-103117-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-22         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-128+30-1-103117 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-23              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-128+30-1-103117-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-24         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-125+50-1-103117 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-25              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-125+50-1-103117-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-26         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-126+90-0-103117 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-27              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-126+90-0-103117-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-28         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-125+50-0-103117 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-29              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-125+50-0-103117-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-30         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-124+00-1-103117 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-31              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-124+00-1-103117-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL        | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL       | n/a                         | none                   | n/a          |                              | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL       | n/a                         | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL       | n/a                         | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

| <b>Lab ID:</b> 1744028-32         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                     |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> GW-124+00-0-103117 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/31/2017  |                     |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A                                 | Bottle FLPE Hg-T        | 250 mL      |                             | none                   | n/a          |                              | Cooler #1 - 1744028 |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler #1 - 1744028 |
| C                                 | Bottle HDPE ICP-ChelCol | 250mL       |                             | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler #1 - 1744028 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744028  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744028-33              |                         | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/31/2017 |              |           |                     |
|--|-------------------------|-----------------------------|------------|------------------------------|--------------|-----------|---------------------|
| <b>Sample:</b> GW-124+00-0-103117-(20) |                         | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 10/31/2017  |              |           |                     |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b>  |
| A                                      | Vacutainer              | 15mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler #1 - 1744028 |
| B                                      | EXTRA_VOL               | 15mL                        | 16-0257    | EDTA (PP)                    | n/a          |           | Cooler #1 - 1744028 |
| C                                      | Bottle FLPE Hg-T        | 250mL                       | n/a        | none                         | n/a          |           | Cooler #1 - 1744028 |
| D                                      | Bottle HDPE ICP-W       | 250mL                       | n/a        | 0.2% HNO3 (BAL)              | 1740028      | <2        | Cooler #1 - 1744028 |
| E                                      | Bottle HDPE ICP-ChelCol | 250mL                       | n/a        | 0.1% Optima HNO3 (BAL)       | 1649047      | <2        | Cooler #1 - 1744028 |

## Shipping Containers

### Cooler #1 - 1744028

**Received:** October 31, 2017 4:30  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 3.4 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

BAL Report 1744028

Received by: Mahmud For BAL use only Date: 10/31/17

Work Order ID: \_\_\_\_\_ Time: 4:30 16:30

Project ID: \_\_\_\_\_

Mail Invoice to:

Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to:

Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes

BAL PM: Jeremy Maute

Client: Port of Tacoma (PIONEER/DOF)

PO Number: 79224

Contact: Troy Bussey (PIONEER)

Phone: 360-570-1700

Client Project ID: Arkema FS DG Inv

Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

| Requested TAT<br>(business days)  | Collection           |                         | Client Sample Info |                           |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|----------------------|-------------------------|--------------------|---------------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                 | Time                    | Matrix Type        | Number of Containers      | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID            |                         |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 1                    | GW-129+65-0-103017      | 10-30-17           | 940                       | Water           | 3                 | Z  | Z   |   |   | X   |   |  |          | 19MS                                 |
|   | 2                    | GW-129+65-0-103017-(20) |                    | 940                       |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 19MS                                 |
|   | 3                    | GW-128+30-0-103017      |                    | 1100                      |                 | 3                 | Z  |   |   | X   |   |   |  |          | 26MS                                 |
|   | 4                    | GW-128+30-0-103017-(20) |                    | 1100                      |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 26MS                                 |
|   | 5                    | GW-128+30-2-103017      |                    | 1145                      |                 | 3                 | Z  |   |   | X   |   |   |  |          | 17MS                                 |
|   | 6                    | GW-128+30-2-103017-(20) |                    | 1145                      |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 17MS                                 |
|   | 7                    | GW-129+65-2-103017      |                    | 1150                      |                 | 3                 | Z  |   |   | X   |   |   |  |          | 22MS                                 |
|   | 8                    | GW-129+65-2-103017-(20) |                    | 1150                      |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 22MS                                 |
|   | 9                    | GW-131+00-2-102717      | 10-27-17           | 1300                      |                 | 3                 | Z  |   |   | X   |   |   |  |          | 13MS                                 |
|   | 10                   | GW-131+00-2-102717-(20) | 10-27-17           | 1300                      |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 13MS                                 |
|   | Trip Blank (specify) |                         |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Leah Piro</u>   |                      | Date: <u>10-31-17</u>   | Time: <u>1315</u>  | Relinquished By:          |                 | Date:             | Time:  |   |   |   |   |   |  |          |                                      |
| Received By:  |                      | Date:                   | Time:              | Total Number of Packages: |                 |                   |  |   |   |   |   |   |  |          |                                      |

All dissolved  
Samples  
field filtered  
0.45um

Specify Here





# Chain-of-Custody Form

BAL Report 1744028

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: Maute For BAL use only Date: 10/31/17  
Work Order ID: \_\_\_\_\_ Time: 16:30  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection              |                   | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|-------------------------|-------------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                    | Time              | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> |                         |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Sample ID  | Specify Here            |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 1  | GW-126+90-2-103017      | 10.30.17          | 1300                      | Water                | 3               | N                 | N  |   |   |   | X   |   |  |          | 29MS                                 |
| 2  | GW-126+90-2-103017-(20) |                   | 1300                      |                      | 5               | Y                 |  |   |   |   |   | X   | X  | X        | 29MS                                 |
| 3  | GW-125+50-2-103017      |                   | 1330                      |                      | 3               | N                 |  |   |   |   | X   |   |  |          | 36MS                                 |
| 4  | GW-125+50-2-103017-(20) |                   | 1330                      |                      | 5               | Y                 |  |   |   |   |   | X   | X  | X        | 36MS                                 |
| 5  | GW-124+00-2-103017      |                   | 1430                      |                      | 3               | N                 |  |   |   |   | Y   |   |  |          | 26MS                                 |
| 6  | GW-124+00-2-103017-(20) |                   | 1430                      |                      | 5               | Y                 |  |   |   |   |   | X   | X  | Y        | 26MS                                 |
| 7  | GW-121+80-2-103017      |                   | 1540                      |                      | 3               | N                 |  |   |   |   | X   |   |  |          | 15MS                                 |
| 8  | GW-121+80-2-103017-(20) |                   | 1540                      |                      | 5               | Y                 |  |   |   |   |   | X   | X  | X        | 15MS                                 |
| 9  | GW-6E3-2-103017-(20)    |                   | 1515                      |                      | 2               | Y                 |  |   |   |   |   | X   |  |          | 38MS                                 |
| 10   | GW-129+65-1-103117      | 10.31.17          | 930                       |                      | 3               | N                 |  |   |   |   | X   |   |  |          | 6MS                                  |
| Trip Blank (specify)   |                         |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Real Pro</u>   | Date: <u>10.31.17</u>   | Time: <u>1315</u> | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |  |          |                                      |
| Received By:   | Date:                   | Time:             | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |

Page 2 of 4

List Hazardous Contaminants: \_\_\_\_\_

samples@brooksupplied.com | brooksupplied.com

Print





# Chain-of-Custody Form

BAL Report 1744028

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

For BAL use only  
Received by: \_\_\_\_\_ Date: 10/31/17  
Work Order ID: \_\_\_\_\_ Time: 16:30  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection           |                         | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|----------------------|-------------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                 | Time                    | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID            |                         |                    |                      |                 |                           |  |   |   |   |   |   |  |          | Specify Here                         |
|   | 1                    | GW-129+65-1-103117-(20) | 10-31-17           | 930                  | Water           | 5                         | Y  | Z   |   |   | X   | X   | X  | 6 MS     |                                      |
|   | 2                    | GW-128+30-1-103117      |                    | 1045                 |                 | 3                         | Z  |   |   | X   |   |   |  | 32 MS    |                                      |
|   | 3                    | GW-128+30-1-103117-(20) |                    | 1045                 |                 | 5                         | Y  |   |   |   | X   | X   | X  | 32 MS    |                                      |
|   | 4                    | GW-125+50-1-103117      |                    | 1000                 |                 | 3                         | Z  |   |   | X   |   |   |  | 30 MS    |                                      |
|   | 5                    | GW-125+50-1-103117-(20) |                    | 1000                 |                 | 5                         | Y  |   |   |   | X   | X   | X  | 30 MS    |                                      |
|   | 6                    | GW-126+90-0-103117      |                    | 945                  |                 | 3                         | Z  |   |   | Y   |   |   |  | 19 MS    |                                      |
|   | 7                    | GW-126+90-0-103117-(20) |                    | 945                  |                 | 5                         | Y  |   |   |   | X   | X   | X  | 19 MS    |                                      |
|   | 8                    | GW-125+50-0-103117      |                    | 1020                 |                 | 3                         | Z  |   |   | Y   |   |   |  | 26 MS    |                                      |
|   | 9                    | GW-125+50-0-103117-(20) |                    | 1020                 |                 | 5                         | Y  |   |   |   | X   | X   | Y  | 26 MS    |                                      |
|   | 10                   | GW-124+00-1-103117      |                    | 1100                 |                 | 3                         | Z  |   |   | X   |   |   |  | 30 MS    |                                      |
|   | Trip Blank (specify) |                         |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Troy Bussey</u>   |                      | Date: <u>10/31/17</u>   |                    | Time: <u>3:15</u>    |                 | Relinquished By:          |  |   | Date:   |   | Time:   |   |  |          |                                      |
| Received By:  |                      | Date:                   |                    | Time:                |                 | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |





# Chain-of-Custody Form

BAL Report 1744028

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: [Signature] For BAL use only Date: 10/31/17  
Work Order ID: \_\_\_\_\_ Time: 16:30  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503  
Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection              |                   | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|-------------------------|-------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                    | Time              | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6/20 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Sample ID  | Specify Here            |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 1  | GW-124+00-1-103117-(20) | 10-31-17 1100     | Water                           | 5                    | Y               | N                 |  |   |   |   | X   | X   | X  | 30 MS    |                                      |
| 2  | GW-124+00-0-103117      | ↓ 1055            | ↓                               | 3                    | N               | ↓                 |  |   |   | X   |   |   |  | 20 MS    |                                      |
| 3  | GW-124+00-0-103117-(20) | ↓ 1055            | ↓                               | 5                    | Y               | ↓                 |  |   |   |   | X   | X   | X  | 20 MS    |                                      |
| 4  |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 5  |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 6  |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 7  |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 8  |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 9  |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 10   |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |                         |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>[Signature]</u>  | Date: <u>10-31-17</u>   | Time: <u>1315</u> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |                                      |
| Received By: _____   | Date: _____             | Time: _____       | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

December 27, 2017

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On November 2, 2017, Brooks Applied Labs (BAL) received thirty-two (32) water samples in a sealed container with a temperature of 6.8°C. Brooks Applied Labs strongly recommends that all samples submitted for speciation quantitation remain at a temperature of  $\leq 6^{\circ}\text{C}$  to maintain sample integrity prior to analysis.

The samples were logged-in for the total recoverable and dissolved metals (aluminum [Al], arsenic [As], calcium [Ca], copper [Cu], iron [Fe], lead [Pb], potassium [K], magnesium [Mg], manganese [Mg], nickel [Ni], sodium [Na], and silicon [Si]) analyses via digestion and subsequent analysis by modified EPA Method 1638. The samples were logged in for total recoverable and dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. The samples were logged-in for the total mercury [Hg] analysis by EPA Method 1631E. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody forms.

The samples submitted for arsenic speciation and dissolved analyses were filtered in the field by the client.

Water samples for arsenic speciation analyses are collected in anoxic Vacutainers (two for each sample). One of the two Vacutainers for sample GW-5G1-3-110117-(20) was open upon receipt. Upon receipt it was observed that the cap was missing, and no sample was left in the container. However, the other vacutainer for sample GW-5G1-3-110117-(20) did not leak. Analyses were completed on the Vacutainer with the lid intact; there was no impact on data quality.

For sample 1744050-14, a sample ID of GW-5I2-1-110117-(20) was listed on the chain-of-custody (COC) form. The corresponding container was labeled GW-5I1-1-110117-(20). In accordance with the client's instructions, the sample was logged in using the sample ID listed on the COC form (GW-5I2-1-110117-(20)).

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives is monitored for contamination to account for any biases associated with the sample results.

Total Recoverable and Dissolved Metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, and Si) Analysis by EPA Method 1638, Mod.

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Total recoverable and dissolved metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, and Si) quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

#### **Batch B173243**

The blank spikes are prepared at the prep step and undergo the same preservation and oven digest as the client samples; so, the blank spike recoveries can be used to monitor the efficacy of the in-bottle oven digest on specific target analytes. The blank spikes in Batch B173243 were not spiked with silicon. Blank spike recoveries for other in-bottle oven digest batches associated with this project (not shown) were spiked with silicon and have produced acceptable recoveries. Certified reference materials (B173243-SRM1 and B173243-SRM2) containing known values of silicon were analyzed in the analytical run and the silicon recoveries were acceptable at 111% and 106%, demonstrating that the analytical method stabilizes silicon in solution. Matrix spikes and matrix spike duplicate recoveries were acceptable for silicon. Since silicon blank spikes for this method have historically yielded acceptable recoveries and the reference materials and MS/MSD silicon recoveries were acceptable, demonstrating the absence of any significant matrix induced interference on silicon results within the analytical platform. No corrective action was taken, and no qualification of data was necessary. The silicon results are reported unqualified.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. BAL requires that the MRL is at least 2 times the value of the corresponding MDL. Due to an elevated MDL, it was necessary to raise the Na MRL to 2 times the value of the MDL. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were ≤ 25% of the native sample concentrations, the recoveries were not reported (**NR**).

#### *Total Recoverable metals (Ni and Pb) Analysis by EPA Method 1640, Mod.*

Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid (HNO<sub>3</sub>) and then prepared according to EPA Method 1640. All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). The ICP-DRC-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

#### **Batch B173038**

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Total and Dissolved Mercury Quantitation by EPA Method 1631E

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

#### **Batch B173045**

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

#### **Batch B173027**

A small arsenic peak of unknown molecular identity eluted near the arsenate peak in sample 1744050-15 and the two peaks (i.e. arsenate and the unknown arsenic species) may be poorly resolved. Consequently, the arsenate result for sample 1744050-15 has been qualified as estimated "J-1".

The sum of arsenic species in the arsenic speciation analyses are compared to the corresponding dissolved arsenic results for a mass balance evaluation. The sum of arsenic species was greater than the corresponding dissolved arsenic values in samples 1744050-04 and 1744050-22. The arsenic results in sample 1744050-04 are close enough to the reporting limit, that the disparities can be explained by the increase in variability for results near and below the MRL. The container labels were inspected and there was no evidence of miss-labeling. Re-analyses confirmed the dissolved arsenic results. The arsenic speciation fractions for samples 1744050-04 and 1744050-22 were subsequently analyzed for total filtered arsenic, confirming the results yielded in the original arsenic speciation analyses. Dissolved arsenic and arsenic speciation results from the original analyses were reported and the results are deemed representative of the supplied samples.

The arsenic speciation results were not method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

With the exception noted above, all data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksapplied.com





## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                  | Lab ID     | Report Matrix | Type         | Sampled    | Received   |
|-------------------------|------------|---------------|--------------|------------|------------|
| GW-126+90-3-103117      | 1744050-01 | Water         | Sample       | 10/31/2017 | 11/02/2017 |
| GW-126+90-3-103117-(20) | 1744050-02 | Water         | Sample       | 10/31/2017 | 11/02/2017 |
| GW-126+90-3-103117-(01) | 1744050-03 | Water         | Sample       | 10/31/2017 | 11/02/2017 |
| GW-126+90-3-103117-(21) | 1744050-04 | Water         | Sample       | 10/31/2017 | 11/02/2017 |
| GW-120+75-2-103117      | 1744050-05 | Water         | Sample       | 10/31/2017 | 11/02/2017 |
| GW-120+75-2-103117-(20) | 1744050-06 | Water         | Sample       | 10/31/2017 | 11/02/2017 |
| GW-6G2-3-110117-(20)    | 1744050-07 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-5G1-3-110117-(20)    | 1744050-08 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-5H1-1-110117-(20)    | 1744050-09 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-4G1-1-110117-(20)    | 1744050-10 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-5H2-2-110117-(20)    | 1744050-11 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-4G2-2-110117-(20)    | 1744050-12 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-4H3-1-110117-(20)    | 1744050-13 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-5I2-1-110117-(20)    | 1744050-14 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-4H4-2-110117-(20)    | 1744050-15 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-5D1-3-110117-(20)    | 1744050-16 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| GW-6E7-3-110117-(20)    | 1744050-17 | Water         | Sample       | 11/01/2017 | 11/02/2017 |
| EB-110117-(20)          | 1744050-18 | Water         | Equip. Blank | 11/01/2017 | 11/02/2017 |
| GW-122+60-2-110217      | 1744050-19 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-122+60-2-110217-(20) | 1744050-20 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-126+90-1-110217      | 1744050-21 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-126+90-1-110217-(20) | 1744050-22 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-5B1-3R-110217        | 1744050-23 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-5B1-3R-110217-(20)   | 1744050-24 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-4B2-3-110217         | 1744050-25 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-4B2-3-110217-(20)    | 1744050-26 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-4B1-3-110217-(20)    | 1744050-27 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-3A1-3R-110217-(20)   | 1744050-28 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-3A1-3R-110217        | 1744050-29 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| EB-110217               | 1744050-30 | Water         | Equip. Blank | 11/02/2017 | 11/02/2017 |
| GW-7E5-3-110217-(20)    | 1744050-31 | Water         | Sample       | 11/02/2017 | 11/02/2017 |
| GW-6E8-3-110217-(20)    | 1744050-32 | Water         | Sample       | 11/02/2017 | 11/02/2017 |



## Batch Summary

| Analyte | Lab Matrix | Method          | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|-----------------|------------|------------|---------|----------|
| Al      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| As      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| As(III) | Water      | SOP BAL-4100    | 11/07/2017 | 11/08/2017 | B173027 | 1701411  |
| As(V)   | Water      | SOP BAL-4100    | 11/07/2017 | 11/08/2017 | B173027 | 1701411  |
| Ca      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Cu      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| DMAs    | Water      | SOP BAL-4100    | 11/07/2017 | 11/08/2017 | B173027 | 1701411  |
| Fe      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Hg      | Water      | EPA 1631 E      | 11/10/2017 | 11/14/2017 | B173045 | 1701418  |
| K       | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Mg      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| MMAAs   | Water      | SOP BAL-4100    | 11/07/2017 | 11/08/2017 | B173027 | 1701411  |
| Mn      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Na      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Ni      | Water      | EPA 1640 Column | 11/08/2017 | 11/28/2017 | B173038 | 1701466  |
| Ni      | Water      | EPA 1640 Column | 11/08/2017 | 11/30/2017 | B173038 | 1701485  |
| Ni      | Water      | EPA 1640 Column | 11/08/2017 | 12/15/2017 | B173038 | 1701559  |
| Pb      | Water      | EPA 1640 Column | 11/08/2017 | 11/28/2017 | B173038 | 1701466  |
| Si      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |





## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-126+90-3-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744050-01                     | As      | Water         | TR    | 32.6    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-01                     | Cu      | Water         | TR    | 1.99    | J         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-01                     | Hg      | Water         | TR    | 23.0    |           | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-01                     | Ni      | Water         | TR    | 2.02    |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-01                     | Pb      | Water         | TR    | 0.700   |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| <b>GW-126+90-3-103117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-02                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1744050-02                     | As      | Water         | D     | 2.62    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-02                     | As(III) | Water         | D     | 4.15    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-02                     | As(V)   | Water         | D     | 0.456   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-02                     | Ca      | Water         | D     | 62700   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1744050-02                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-02                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-02                     | Fe      | Water         | D     | 240     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1744050-02                     | Hg      | Water         | D     | 0.25    | J         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-02                     | K       | Water         | D     | 16700   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1744050-02                     | Mg      | Water         | D     | 62900   |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1744050-02                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744050-02                     | Mn      | Water         | D     | 59.9    |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-02                     | Na      | Water         | D     | 131000  |           | 93.9  | 188   | µg/L | B173243 | 1701505  |
| 1744050-02                     | Ni      | Water         | D     | 0.226   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-02                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1744050-02                     | Si      | Water         | D     | 21800   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-126+90-3-103117-(01)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-03                     | As      | Water         | TR    | 46.8    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-03                     | Cu      | Water         | TR    | 3.04    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-03                     | Hg      | Water         | TR    | 36.1    |           | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-03                     | Ni      | Water         | TR    | 2.05    |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-03                     | Pb      | Water         | TR    | 0.560   |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-126+90-3-103117-(21)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-04                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1744050-04                     | As      | Water         | D     | 3.20    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-04                     | As(III) | Water         | D     | 6.67    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-04                     | As(V)   | Water         | D     | 0.771   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-04                     | Ca      | Water         | D     | 64700   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1744050-04                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-04                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-04                     | Fe      | Water         | D     | 246     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1744050-04                     | Hg      | Water         | D     | 0.26    | J         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-04                     | K       | Water         | D     | 17500   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1744050-04                     | Mg      | Water         | D     | 65300   |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1744050-04                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744050-04                     | Mn      | Water         | D     | 61.0    |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-04                     | Na      | Water         | D     | 136000  |           | 93.9  | 188   | µg/L | B173243 | 1701505  |
| 1744050-04                     | Ni      | Water         | D     | 0.245   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-04                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1744050-04                     | Si      | Water         | D     | 22600   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-120+75-2-103117</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744050-05                     | As      | Water         | TR    | 86.5    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-05                     | Cu      | Water         | TR    | 1.55    | J         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-05                     | Hg      | Water         | TR    | 2.82    |           | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1744050-05                     | Ni      | Water         | TR    | 1.06    |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-05                     | Pb      | Water         | TR    | 2.16    |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|----------|-----------|-------|-------|------|---------|----------|
| <b>GW-120+75-2-103117-(20)</b> |         |               |       |          |           |       |       |      |         |          |
| 1744050-06                     | Al      | Water         | D     | ≤ 20.4   | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1744050-06                     | As      | Water         | D     | 64.9     |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-06                     | As(III) | Water         | D     | 22.9     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-06                     | As(V)   | Water         | D     | 12.4     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-06                     | Ca      | Water         | D     | 169000   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1744050-06                     | Cu      | Water         | D     | ≤ 0.898  | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-06                     | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-06                     | Fe      | Water         | D     | 914      |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1744050-06                     | Hg      | Water         | D     | 0.35     | J         | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1744050-06                     | K       | Water         | D     | 203000   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1744050-06                     | Mg      | Water         | D     | 341000   |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1744050-06                     | MMAs    | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744050-06                     | Mn      | Water         | D     | 1040     |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-06                     | Na      | Water         | D     | 10400000 |           | 3520  | 7040  | µg/L | B173243 | 1701505  |
| 1744050-06                     | Ni      | Water         | D     | 0.752    |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-06                     | Pb      | Water         | D     | ≤ 0.101  | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1744050-06                     | Si      | Water         | D     | 35400    |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-6G2-3-110117-(20)</b>    |         |               |       |          |           |       |       |      |         |          |
| 1744050-07                     | As(III) | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-07                     | As(V)   | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-07                     | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-07                     | MMAs    | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| <b>GW-5G1-3-110117-(20)</b>    |         |               |       |          |           |       |       |      |         |          |
| 1744050-08                     | As(III) | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-08                     | As(V)   | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-08                     | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-08                     | MMAs    | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| <b>GW-5H1-1-110117-(20)</b>    |         |               |       |          |           |       |       |      |         |          |
| 1744050-09                     | As(III) | Water         | D     | 31.2     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-09                     | As(V)   | Water         | D     | 7.66     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-09                     | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-09                     | MMAs    | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |



## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-4G1-1-110117-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744050-10                  | As(III) | Water         | D     | 110     |           | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-10                  | As(V)   | Water         | D     | 14.2    |           | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-10                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B173027 | 1701411  |
| 1744050-10                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B173027 | 1701411  |
| <b>GW-5H2-2-110117-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744050-11                  | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-11                  | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-11                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B173027 | 1701411  |
| 1744050-11                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B173027 | 1701411  |
| <b>GW-4G2-2-110117-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744050-12                  | As(III) | Water         | D     | 5.26    |           | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-12                  | As(V)   | Water         | D     | 2.46    |           | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-12                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B173027 | 1701411  |
| 1744050-12                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B173027 | 1701411  |
| <b>GW-4H3-1-110117-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744050-13                  | As(III) | Water         | D     | 2.83    |           | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-13                  | As(V)   | Water         | D     | 303     |           | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-13                  | DMAs    | Water         | D     | 2.55    |           | 0.250 | 1.05 | µg/L | B173027 | 1701411  |
| 1744050-13                  | MMAs    | Water         | D     | 1.22    |           | 0.200 | 1.15 | µg/L | B173027 | 1701411  |
| <b>GW-5I2-1-110117-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744050-14                  | As(III) | Water         | D     | 1.28    |           | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-14                  | As(V)   | Water         | D     | 84.3    |           | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-14                  | DMAs    | Water         | D     | 1.14    |           | 0.250 | 1.05 | µg/L | B173027 | 1701411  |
| 1744050-14                  | MMAs    | Water         | D     | 1.54    |           | 0.200 | 1.15 | µg/L | B173027 | 1701411  |
| <b>GW-4H4-2-110117-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744050-15                  | As(III) | Water         | D     | 0.392   | J         | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-15                  | As(V)   | Water         | D     | ≤ 0.200 | J-1, U    | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-15                  | DMAs    | Water         | D     | 0.618   | J         | 0.250 | 1.05 | µg/L | B173027 | 1701411  |
| 1744050-15                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B173027 | 1701411  |



## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-5D1-3-110117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-16                  | As(III) | Water         | D     | 9.93    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-16                  | As(V)   | Water         | D     | 5.27    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-16                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-16                  | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| <b>GW-6E7-3-110117-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-17                  | As(III) | Water         | D     | 142     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-17                  | As(V)   | Water         | D     | 66.5    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-17                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-17                  | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| <b>EB-110117-(20)</b>       |         |               |       |         |           |       |       |      |         |          |
| 1744050-18                  | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-18                  | As(V)   | Water         | D     | 0.272   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-18                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-18                  | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| <b>GW-122+60-2-110217</b>   |         |               |       |         |           |       |       |      |         |          |
| 1744050-19                  | As      | Water         | TR    | 3240    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-19                  | Cu      | Water         | TR    | 2.00    | J         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-19                  | Hg      | Water         | TR    | 1.38    |           | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1744050-19                  | Ni      | Water         | TR    | 79.5    |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-19                  | Pb      | Water         | TR    | 0.141   | J         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-122+60-2-110217-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-20                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1744050-20                     | As      | Water         | D     | 3340    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-20                     | As(III) | Water         | D     | 710     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-20                     | As(V)   | Water         | D     | 50.4    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-20                     | Ca      | Water         | D     | 166000  |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1744050-20                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-20                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-20                     | Fe      | Water         | D     | 46.9    |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1744050-20                     | Hg      | Water         | D     | 1.21    |           | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1744050-20                     | K       | Water         | D     | 171000  |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1744050-20                     | Mg      | Water         | D     | 283000  |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1744050-20                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744050-20                     | Mn      | Water         | D     | 23.2    |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-20                     | Na      | Water         | D     | 7330000 |           | 2350  | 4690  | µg/L | B173243 | 1701505  |
| 1744050-20                     | Ni      | Water         | D     | 45.6    |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-20                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1744050-20                     | Si      | Water         | D     | 42600   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-126+90-1-110217</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744050-21                     | As      | Water         | TR    | 1190    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-21                     | Cu      | Water         | TR    | 632     |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-21                     | Hg      | Water         | TR    | 160     |           | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1744050-21                     | Ni      | Water         | TR    | 623     |           | 3.54  | 15.2  | µg/L | B173038 | 1701559  |
| 1744050-21                     | Pb      | Water         | TR    | 0.476   |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-126+90-1-110217-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-22                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1744050-22                     | As      | Water         | D     | 30.1    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-22                     | As(III) | Water         | D     | 0.275   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-22                     | As(V)   | Water         | D     | 52.9    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-22                     | Ca      | Water         | D     | 330000  |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1744050-22                     | Cu      | Water         | D     | 5.58    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-22                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-22                     | Fe      | Water         | D     | 203     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1744050-22                     | Hg      | Water         | D     | 13.2    |           | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-22                     | K       | Water         | D     | 299000  |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1744050-22                     | Mg      | Water         | D     | 831000  |           | 551   | 1730  | µg/L | B173243 | 1701505  |
| 1744050-22                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744050-22                     | Mn      | Water         | D     | 107     |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-22                     | Na      | Water         | D     | 7190000 |           | 2350  | 4690  | µg/L | B173243 | 1701505  |
| 1744050-22                     | Ni      | Water         | D     | 463     |           | 3.54  | 15.2  | µg/L | B173038 | 1701559  |
| 1744050-22                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1744050-22                     | Si      | Water         | D     | 5890    |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-5B1-3R-110217</b>        |         |               |       |         |           |       |       |      |         |          |
| 1744050-23                     | As      | Water         | TR    | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-23                     | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-23                     | Hg      | Water         | TR    | 0.13    | J         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-23                     | Ni      | Water         | TR    | 0.850   |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-23                     | Pb      | Water         | TR    | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |





## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-5B1-3R-110217-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-24                   | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1744050-24                   | As      | Water         | D     | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-24                   | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-24                   | As(V)   | Water         | D     | 0.244   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-24                   | Ca      | Water         | D     | 71100   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1744050-24                   | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-24                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-24                   | Fe      | Water         | D     | 396     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1744050-24                   | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-24                   | K       | Water         | D     | 38400   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1744050-24                   | Mg      | Water         | D     | 111000  |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1744050-24                   | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744050-24                   | Mn      | Water         | D     | 113     |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-24                   | Na      | Water         | D     | 504000  |           | 2350  | 4690  | µg/L | B173243 | 1701505  |
| 1744050-24                   | Ni      | Water         | D     | 0.265   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-24                   | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1744050-24                   | Si      | Water         | D     | 22000   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-4B2-3-110217</b>       |         |               |       |         |           |       |       |      |         |          |
| 1744050-25                   | As      | Water         | TR    | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-25                   | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-25                   | Hg      | Water         | TR    | ≤ 0.10  | U         | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1744050-25                   | Ni      | Water         | TR    | 0.247   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-25                   | Pb      | Water         | TR    | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |





## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|----------|-----------|-------|-------|------|---------|----------|
| <b>GW-4B2-3-110217-(20)</b> |         |               |       |          |           |       |       |      |         |          |
| 1744050-26                  | Al      | Water         | D     | ≤ 20.4   | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1744050-26                  | As      | Water         | D     | ≤ 0.449  | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-26                  | As(III) | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-26                  | As(V)   | Water         | D     | 0.250    | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-26                  | Ca      | Water         | D     | 185000   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1744050-26                  | Cu      | Water         | D     | ≤ 0.898  | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-26                  | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-26                  | Fe      | Water         | D     | 21.4     | J         | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1744050-26                  | Hg      | Water         | D     | 0.11     | J         | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1744050-26                  | K       | Water         | D     | 163000   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1744050-26                  | Mg      | Water         | D     | 397000   |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1744050-26                  | MMAs    | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744050-26                  | Mn      | Water         | D     | 449      |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-26                  | Na      | Water         | D     | 10700000 |           | 3520  | 7040  | µg/L | B173243 | 1701505  |
| 1744050-26                  | Ni      | Water         | D     | 0.196    | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-26                  | Pb      | Water         | D     | ≤ 0.101  | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1744050-26                  | Si      | Water         | D     | 24300    |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-4B1-3-110217-(20)</b> |         |               |       |          |           |       |       |      |         |          |
| 1744050-27                  | As(III) | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-27                  | As(V)   | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-27                  | DMAs    | Water         | D     | ≤ 0.250  | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-27                  | MMAs    | Water         | D     | ≤ 0.200  | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |



## Sample Results

| Sample                       | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-3A1-3R-110217-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1744050-28                   | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1744050-28                   | As      | Water         | D     | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-28                   | As(III) | Water         | D     | 0.243   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-28                   | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-28                   | Ca      | Water         | D     | 70800   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1744050-28                   | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-28                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-28                   | Fe      | Water         | D     | 515     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1744050-28                   | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-28                   | K       | Water         | D     | 35000   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1744050-28                   | Mg      | Water         | D     | 107000  |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1744050-28                   | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1744050-28                   | Mn      | Water         | D     | 129     |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-28                   | Na      | Water         | D     | 346000  |           | 93.9  | 188   | µg/L | B173243 | 1701505  |
| 1744050-28                   | Ni      | Water         | D     | ≤ 0.141 | U         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1744050-28                   | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1744050-28                   | Si      | Water         | D     | 21600   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-3A1-3R-110217</b>      |         |               |       |         |           |       |       |      |         |          |
| 1744050-29                   | As      | Water         | TR    | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1744050-29                   | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1744050-29                   | Hg      | Water         | TR    | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1744050-29                   | Ni      | Water         | TR    | 0.340   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1744050-29                   | Pb      | Water         | TR    | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| <b>EB-110217</b>             |         |               |       |         |           |       |       |      |         |          |
| 1744050-30                   | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-30                   | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-30                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-30                   | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| <b>GW-7E5-3-110217-(20)</b>  |         |               |       |         |           |       |       |      |         |          |
| 1744050-31                   | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-31                   | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1744050-31                   | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1744050-31                   | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL  | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|---------|-----------|-------|------|------|---------|----------|
| <b>GW-6E8-3-110217-(20)</b> |         |               |       |         |           |       |      |      |         |          |
| 1744050-32                  | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-32                  | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00 | µg/L | B173027 | 1701411  |
| 1744050-32                  | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05 | µg/L | B173027 | 1701411  |
| 1744050-32                  | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15 | µg/L | B173027 | 1701411  |



## Accuracy & Precision Summary

Batch: B173027  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173027-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.583  | µg/L  | 111% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 5.341  | µg/L  | 107% 75-125  |              |
|              | DMAs  |        | 3.198 | 3.198  | µg/L  | 100% 75-125  |              |
| B173027-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMAAs                                       |        | 4.634 | 4.859  | µg/L  | 105% 75-125  |              |
| B173027-DUP3 | <b>Duplicate, (1744050-02)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 4.150  |       | 4.317  | µg/L  |              | 4% 25        |
|              | As(V)                                       | 0.456  |       | 0.454  | µg/L  |              | 0.5% 25      |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B173027-MS3  | <b>Matrix Spike, (1744050-02)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 4.150  | 50.00 | 52.80  | µg/L  | 97% 75-125   |              |
|              | As(V)                                       | 0.456  | 50.00 | 52.13  | µg/L  | 103% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 52.37  | µg/L  | 103% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 50.21  | µg/L  | 100% 75-125  |              |
| B173027-MSD3 | <b>Matrix Spike Duplicate, (1744050-02)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 4.150  | 50.00 | 53.13  | µg/L  | 98% 75-125   | 0.6% 25      |
|              | As(V)                                       | 0.456  | 50.00 | 52.30  | µg/L  | 104% 75-125  | 0.3% 25      |
|              | DMAs  | ND     | 51.00 | 52.12  | µg/L  | 102% 75-125  | 0.5% 25      |
|              | MMAAs                                       | ND     | 50.00 | 50.39  | µg/L  | 101% 75-125  | 0.4% 25      |
| B173027-DUP4 | <b>Duplicate, (1744050-11)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | As(V)                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B173027-MS4  | <b>Matrix Spike, (1744050-11)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 49.52  | µg/L  | 99% 75-125   |              |
|              | As(V)                                       | ND     | 50.00 | 50.05  | µg/L  | 100% 75-125  |              |
|              | DMAs  | ND     | 51.00 | 51.95  | µg/L  | 102% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 49.48  | µg/L  | 99% 75-125   |              |



## Accuracy & Precision Summary

Batch: B173027  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173027-MSD4</b> | <b>Matrix Spike Duplicate, (1744050-11)</b> |        |       |        |       |              |              |
|                     | As(III)                                     | ND     | 50.00 | 49.22  | µg/L  | 98% 75-125   | 0.6% 25      |
|                     | As(V)                                       | ND     | 50.00 | 51.66  | µg/L  | 103% 75-125  | 3% 25        |
|                     | DMAAs                                       | ND     | 51.00 | 52.25  | µg/L  | 102% 75-125  | 0.6% 25      |
|                     | MMAAs                                       | ND     | 50.00 | 50.81  | µg/L  | 102% 75-125  | 3% 25        |
| <b>B173027-DUP5</b> | <b>Duplicate, (1744050-17)</b>              |        |       |        |       |              |              |
|                     | As(III)                                     | 142.1  |       | 140.9  | µg/L  |              | 0.8% 25      |
|                     | As(V)                                       | 66.53  |       | 65.64  | µg/L  |              | 1% 25        |
|                     | DMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
|                     | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| <b>B173027-MS5</b>  | <b>Matrix Spike, (1744050-17)</b>           |        |       |        |       |              |              |
|                     | As(III)                                     | 142.1  | 50.00 | 192.6  | µg/L  | 101% 75-125  |              |
|                     | As(V)                                       | 66.53  | 50.00 | 114.9  | µg/L  | 97% 75-125   |              |
|                     | DMAAs                                       | ND     | 51.00 | 49.05  | µg/L  | 96% 75-125   |              |
|                     | MMAAs                                       | ND     | 50.00 | 48.00  | µg/L  | 96% 75-125   |              |
| <b>B173027-MSD5</b> | <b>Matrix Spike Duplicate, (1744050-17)</b> |        |       |        |       |              |              |
|                     | As(III)                                     | 142.1  | 50.00 | 191.6  | µg/L  | 99% 75-125   | 0.6% 25      |
|                     | As(V)                                       | 66.53  | 50.00 | 115.2  | µg/L  | 97% 75-125   | 0.3% 25      |
|                     | DMAAs                                       | ND     | 51.00 | 48.75  | µg/L  | 96% 75-125   | 0.6% 25      |
|                     | MMAAs                                       | ND     | 50.00 | 47.77  | µg/L  | 96% 75-125   | 0.5% 25      |



## Accuracy & Precision Summary

Batch: B173038  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte                              | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|--------|--------|-------|--------------|--------------|
| B173038-BS1  | Blank Spike, (1722014)               |        |        |        |       |              |              |
|              | Ni                                   |        | 0.5000 | 0.4684 | µg/L  | 94% 75-125   |              |
|              | Pb                                   |        | 0.5000 | 0.5143 | µg/L  | 103% 75-125  |              |
| B173038-BS2  | Blank Spike, (1722014)               |        |        |        |       |              |              |
|              | Ni                                   |        | 0.5000 | 0.4753 | µg/L  | 95% 75-125   |              |
|              | Pb                                   |        | 0.5000 | 0.5123 | µg/L  | 102% 75-125  |              |
| B173038-DUP1 | Duplicate, (1744050-19)              |        |        |        |       |              |              |
|              | Ni                                   | 79.47  |        | 77.29  | µg/L  |              | 3% 20        |
|              | Pb                                   | 0.1413 |        | 0.1449 | µg/L  |              | 3% 20        |
| B173038-MS1  | Matrix Spike, (1744050-19)           |        |        |        |       |              |              |
|              | Ni                                   | 79.47  | 10.10  | 87.56  | µg/L  | NR 75-125    |              |
|              | Pb                                   | 0.1413 | 10.10  | 11.24  | µg/L  | 110% 75-125  |              |
| B173038-MSD1 | Matrix Spike Duplicate, (1744050-19) |        |        |        |       |              |              |
|              | Ni                                   | 79.47  | 10.10  | 87.76  | µg/L  | NR 75-125    | N/C 20       |
|              | Pb                                   | 0.1413 | 10.10  | 11.19  | µg/L  | 109% 75-125  | 0.4% 20      |
| B173038-DUP7 | Duplicate, (1744050-21)              |        |        |        |       |              |              |
|              | Ni                                   | 622.7  |        | 619.6  | µg/L  |              | 0.5% 20      |
| B173038-MS7  | Matrix Spike, (1744050-21)           |        |        |        |       |              |              |
|              | Ni                                   | 622.7  | 252.5  | 883.7  | µg/L  | 103% 75-125  |              |
| B173038-MSD7 | Matrix Spike Duplicate, (1744050-21) |        |        |        |       |              |              |
|              | Ni                                   | 622.7  | 252.5  | 883.5  | µg/L  | 103% 75-125  | 0.01% 20     |
| B173038-DUP5 | Duplicate, (1744050-29)              |        |        |        |       |              |              |
|              | Ni                                   | 0.3395 |        | 0.3199 | µg/L  |              | 6% 20        |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173038  
**Lab Matrix:** Water  
**Method:** EPA 1640 Column

| Sample       | Analyte                                    | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B173038-MS5  | Matrix Spike, (1744050-29)<br>Ni           | 0.3395 | 10.10 | 10.24  | µg/L  | 98% 75-125   |              |
| B173038-MSD5 | Matrix Spike Duplicate, (1744050-29)<br>Ni | 0.3395 | 10.10 | 10.14  | µg/L  | 97% 75-125   | 0.9% 20      |



## Accuracy & Precision Summary

**Batch:** B173045  
**Lab Matrix:** Water  
**Method:** EPA 1631 E

| Sample              | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|--|--------|-------|--------|-------|--------------|--------------|
| <b>B173045-SRM1</b> | <b>Standard Reference Material (1745012, THg SRM NIST 1641d)</b><br>Hg |        | 15.68 | 15.35  | ng/L  | 98% 80-120   |              |
| <b>B173045-MS1</b>  | <b>Matrix Spike (1744050-21)</b><br>Hg                                 | 160.3  | 4.124 | 151.1  | ng/L  | NR 71-125    |              |
| <b>B173045-MSD1</b> | <b>Matrix Spike Duplicate (1744050-21)</b><br>Hg                       | 160.3  | 4.124 | 156.7  | ng/L  | NR 71-125    | N/C 24       |
| <b>B173045-MS3</b>  | <b>Matrix Spike (1745005-12)</b><br>Hg                                 | 4.85   | 20.41 | 25.91  | ng/L  | 103% 71-125  |              |
| <b>B173045-MSD3</b> | <b>Matrix Spike Duplicate (1745005-12)</b><br>Hg                       | 4.85   | 20.41 | 25.06  | ng/L  | 99% 71-125   | 3% 24        |





## Accuracy & Precision Summary

Batch: B173243  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample      | Analyte                | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|------------------------|--------|-------|--------|-------|--------------|--------------|
| B173243-BS1 | Blank Spike, (1738012) |        |       |        |       |              |              |
|             |                        | Al     |       | 400.0  | 361.6 | µg/L         | 90% 75-125   |
|             |                        | As     |       | 20.00  | 20.48 | µg/L         | 102% 75-125  |
|             |                        | Ca     |       | 400.0  | 378.3 | µg/L         | 95% 75-125   |
|             |                        | Cu     |       | 20.00  | 20.51 | µg/L         | 103% 75-125  |
|             |                        | Fe     |       | 400.0  | 399.1 | µg/L         | 100% 75-125  |
|             |                        | K      |       | 400.0  | 392.4 | µg/L         | 98% 75-125   |
|             |                        | Mg     |       | 400.0  | 370.3 | µg/L         | 93% 75-125   |
|             |                        | Mn     |       | 20.00  | 20.04 | µg/L         | 100% 75-125  |
|             |                        | Na     |       | 400.0  | 381.5 | µg/L         | 95% 75-125   |
| B173243-BS2 | Blank Spike, (1738012) |        |       |        |       |              |              |
|             |                        | Al     |       | 400.0  | 366.0 | µg/L         | 92% 75-125   |
|             |                        | As     |       | 20.00  | 20.33 | µg/L         | 102% 75-125  |
|             |                        | Ca     |       | 400.0  | 383.8 | µg/L         | 96% 75-125   |
|             |                        | Cu     |       | 20.00  | 20.82 | µg/L         | 104% 75-125  |
|             |                        | Fe     |       | 400.0  | 405.3 | µg/L         | 101% 75-125  |
|             |                        | K      |       | 400.0  | 399.2 | µg/L         | 100% 75-125  |
|             |                        | Mg     |       | 400.0  | 375.1 | µg/L         | 94% 75-125   |
|             |                        | Mn     |       | 20.00  | 20.19 | µg/L         | 101% 75-125  |
|             |                        | Na     |       | 400.0  | 388.5 | µg/L         | 97% 75-125   |
| B173243-BS3 | Blank Spike, (1738012) |        |       |        |       |              |              |
|             |                        | Al     |       | 400.0  | 366.4 | µg/L         | 92% 75-125   |
|             |                        | As     |       | 20.00  | 20.35 | µg/L         | 102% 75-125  |
|             |                        | Ca     |       | 400.0  | 380.0 | µg/L         | 95% 75-125   |
|             |                        | Cu     |       | 20.00  | 20.73 | µg/L         | 104% 75-125  |
|             |                        | Fe     |       | 400.0  | 399.4 | µg/L         | 100% 75-125  |
|             |                        | K      |       | 400.0  | 396.2 | µg/L         | 99% 75-125   |
|             |                        | Mg     |       | 400.0  | 370.3 | µg/L         | 93% 75-125   |
|             |                        | Mn     |       | 20.00  | 19.91 | µg/L         | 100% 75-125  |
|             |                        | Na     |       | 400.0  | 385.7 | µg/L         | 96% 75-125   |



## Accuracy & Precision Summary

Batch: B173243  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|--|--------|-------|--------|-------|--------------|--------------|
| <b>B173243-SRM1</b> | <b>Standard Reference Material (1724009, T221 as SRM)</b>            |        |       |        |       |              |              |
|                     | Al   |        | 374.0 | 352.1  | µg/L  | 94% 75-125   |              |
|                     | As   |        | 17.70 | 18.03  | µg/L  | 102% 75-125  |              |
|                     | Ca   | 16700  |       | 16120  | µg/L  | 97% 75-125   |              |
|                     | Cu   | 3.780  |       | 4.020  | µg/L  | 106% 75-125  |              |
|                     | Fe   | 328.0  |       | 327.2  | µg/L  | 100% 75-125  |              |
|                     | K  | 1900   |       | 1885   | µg/L  | 99% 75-125   |              |
|                     | Mg   | 3770   |       | 3525   | µg/L  | 93% 75-125   |              |
|                     | Mn   | 33.60  |       | 33.65  | µg/L  | 100% 75-125  |              |
|                     | Na   | 17400  |       | 16820  | µg/L  | 97% 75-125   |              |
|                     | Si   | 5843   |       | 6506   | µg/L  | 111% 75-125  |              |
| <b>B173243-SRM2</b> | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |        |       |        |       |              |              |
|                     | Al   |        | 53.00 | 49.32  | µg/L  | 93% 75-125   |              |
|                     | As   |        | 8.075 | 7.838  | µg/L  | 97% 75-125   |              |
|                     | Ca   | 5615   |       | 5181   | µg/L  | 92% N/A      |              |
|                     | Cu   | 85.75  |       | 86.16  | µg/L  | 100% 75-125  |              |
|                     | Fe   | 36.80  |       | 37.05  | µg/L  | 101% 75-125  |              |
|                     | K  | 579.9  |       | 570.0  | µg/L  | 98% 0-200    |              |
|                     | Mg   | 1059   |       | 954.4  | µg/L  | 90% N/A      |              |
|                     | Mn   | 40.39  |       | 39.23  | µg/L  | 97% 75-125   |              |
|                     | Na   | 3137   |       | 2956   | µg/L  | 94% N/A      |              |
|                     | Si   | 5210   |       | 5538   | µg/L  | 106% N/A     |              |
| <b>B173243-DUP4</b> | <b>Duplicate, (1744050-01)</b>                                       |        |       |        |       |              |              |
|                     | Al   | 576.3  |       | 574.2  | µg/L  |              | 0.4% 20      |
|                     | As   | 32.62  |       | 33.18  | µg/L  |              | 2% 20        |
|                     | Ca   | 64360  |       | 66040  | µg/L  |              | 3% 20        |
|                     | Cu   | 1.992  |       | 2.065  | µg/L  |              | 4% 20        |
|                     | Fe   | 706.1  |       | 705.3  | µg/L  |              | 0.1% 20      |
|                     | K  | 17460  |       | 17580  | µg/L  |              | 0.7% 20      |
|                     | Mg   | 65850  |       | 65870  | µg/L  |              | 0.03% 20     |
|                     | Mn   | 66.23  |       | 64.63  | µg/L  |              | 2% 20        |
|                     | Na   | 136500 |       | 134700 | µg/L  |              | 1% 20        |
|                     | Si   | 24320  |       | 24340  | µg/L  |              | 0.07% 20     |



## Accuracy & Precision Summary

Batch: B173243  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike | Result | Units       | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------------|--------------|--------------|
| <b>B173243-MS4</b>  | <b>Matrix Spike, (1744050-01)</b>           |        |       |        |             |              |              |
|                     | Al  | 576.3  | 4082  | 4187   | µg/L        | 88% 75-125   |              |
|                     | As  | 32.62  | 408.2 | 430.9  | µg/L        | 98% 75-125   |              |
|                     | Ca  | 64360  | 4082  | 68810  | µg/L        | NR 75-125    |              |
|                     | Cu  | 1.992  | 408.2 | 425.3  | µg/L        | 104% 75-125  |              |
|                     | Fe  | 706.1  | 4082  | 4481   | µg/L        | 92% 75-125   |              |
|                     | K   | 17460  | 4082  | 21210  | µg/L        | NR 75-125    |              |
|                     | Mg  | 65850  | 4082  | 68240  | µg/L        | NR 75-125    |              |
|                     | Mn  | 66.23  | 408.2 | 456.8  | µg/L        | 96% 75-125   |              |
|                     | Na  | 136500 | 4082  | 136300 | µg/L        | NR 75-125    |              |
| Si                  | 24320                                       | 40820  | 65740 | µg/L   | 101% 75-125 |              |              |
| <b>B173243-MSD4</b> | <b>Matrix Spike Duplicate, (1744050-01)</b> |        |       |        |             |              |              |
|                     | Al  | 576.3  | 4082  | 4218   | µg/L        | 89% 75-125   | 0.7% 20      |
|                     | As  | 32.62  | 408.2 | 437.3  | µg/L        | 99% 75-125   | 1% 20        |
|                     | Ca  | 64360  | 4082  | 69770  | µg/L        | NR 75-125    | N/C 20       |
|                     | Cu  | 1.992  | 408.2 | 431.4  | µg/L        | 105% 75-125  | 1% 20        |
|                     | Fe  | 706.1  | 4082  | 4296   | µg/L        | 88% 75-125   | 4% 20        |
|                     | K   | 17460  | 4082  | 21290  | µg/L        | NR 75-125    | N/C 20       |
|                     | Mg  | 65850  | 4082  | 68890  | µg/L        | NR 75-125    | N/C 20       |
|                     | Mn  | 66.23  | 408.2 | 463.8  | µg/L        | 97% 75-125   | 2% 20        |
|                     | Na  | 136500 | 4082  | 138400 | µg/L        | NR 75-125    | N/C 20       |
| Si                  | 24320                                       | 40820  | 65770 | µg/L   | 102% 75-125 | 0.06% 20     |              |
| <b>B173243-DUP5</b> | <b>Duplicate, (1744050-21)</b>              |        |       |        |             |              |              |
|                     | Al  | 345.4  |       | 348.9  | µg/L        |              | 1% 20        |
|                     | As  | 1192   |       | 1230   | µg/L        |              | 3% 20        |
|                     | Ca  | 326200 |       | 329800 | µg/L        |              | 1% 20        |
|                     | Cu  | 632.3  |       | 635.5  | µg/L        |              | 0.5% 20      |
|                     | Fe  | 103300 |       | 105800 | µg/L        |              | 2% 20        |
|                     | Mn  | 299600 |       | 302100 | µg/L        |              | 0.8% 20      |
|                     | 1461  |        | 1451  | µg/L   |             | 0.7% 20      |              |



## Accuracy & Precision Summary

Batch: B173243  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173243-MS5</b>  | <b>Matrix Spike, (1744050-21)</b>           |        |       |        |       |              |              |
|                     | Al  | 345.4  | 4082  | 5285   | µg/L  | 121% 75-125  |              |
|                     | As  | 1192   | 408.2 | 1654   | µg/L  | 113% 75-125  |              |
|                     | Ca  | 326200 | 4082  | 327600 | µg/L  | NR 75-125    |              |
|                     | Cu  | 632.3  | 408.2 | 1135   | µg/L  | 123% 75-125  |              |
|                     | Fe  | 103300 | 4082  | 108400 | µg/L  | NR 75-125    |              |
|                     | K   | 299600 | 4082  | 300600 | µg/L  | NR 75-125    |              |
|                     | Mn  | 1461   | 408.2 | 1950   | µg/L  | 120% 75-125  |              |
| <b>B173243-MSD5</b> | <b>Matrix Spike Duplicate, (1744050-21)</b> |        |       |        |       |              |              |
|                     | Al  | 345.4  | 4082  | 4870   | µg/L  | 111% 75-125  | 8% 20        |
|                     | As  | 1192   | 408.2 | 1634   | µg/L  | 108% 75-125  | 1% 20        |
|                     | Ca  | 326200 | 4082  | 329800 | µg/L  | NR 75-125    | N/C 20       |
|                     | Cu  | 632.3  | 408.2 | 1105   | µg/L  | 116% 75-125  | 3% 20        |
|                     | Fe  | 103300 | 4082  | 109000 | µg/L  | NR 75-125    | N/C 20       |
|                     | K   | 299600 | 4082  | 300100 | µg/L  | NR 75-125    | N/C 20       |
|                     | Mn  | 1461   | 408.2 | 1919   | µg/L  | 112% 75-125  | 2% 20        |



## Method Blanks & Reporting Limits

**Batch:** B173027  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** DMA<sub>s</sub>

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b> | <b>Result</b> | <b>Units</b> |
|---------------|---------------|--------------|
| B173027-BLK1  | 0.00          | µg/L         |
| B173027-BLK2  | 0.00          | µg/L         |
| B173027-BLK3  | 0.00          | µg/L         |
| B173027-BLK4  | 0.00          | µg/L         |

**Average:** 0.000  
**Limit:** 0.023

**MDL:** 0.004  
**MRL:** 0.023



## Method Blanks & Reporting Limits

**Batch:** B173038  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Ni

| Sample          | Result | Units |                    |
|-----------------|--------|-------|--------------------|
| B173038-BLK1    | 0.0144 | µg/L  |                    |
| B173038-BLK2    | 0.0155 | µg/L  |                    |
| B173038-BLK3    | 0.0121 | µg/L  |                    |
| B173038-BLK4    | 0.0162 | µg/L  |                    |
| <b>Average:</b> | 0.0146 |       | <b>MDL:</b> 0.0070 |
| <b>Limit:</b>   | 0.0300 |       | <b>MRL:</b> 0.0300 |

**Analyte:** Pb

| Sample          | Result  | Units |                    |
|-----------------|---------|-------|--------------------|
| B173038-BLK1    | -0.0002 | µg/L  |                    |
| B173038-BLK2    | -0.0003 | µg/L  |                    |
| B173038-BLK3    | -0.0002 | µg/L  |                    |
| B173038-BLK4    | -0.0002 | µg/L  |                    |
| <b>Average:</b> | -0.0002 |       | <b>MDL:</b> 0.0050 |
| <b>Limit:</b>   | 0.0150  |       | <b>MRL:</b> 0.0150 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B173045  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample       | Result               | Units |                                 |                  |
|--------------|----------------------|-------|---------------------------------|------------------|
| B173045-BLK1 | 0.13                 | ng/L  |                                 |                  |
| B173045-BLK2 | 0.09                 | ng/L  |                                 |                  |
| B173045-BLK3 | 0.08                 | ng/L  |                                 |                  |
| B173045-BLK4 | 0.12                 | ng/L  |                                 |                  |
|              | <b>Average:</b> 0.11 |       | <b>Standard Deviation:</b> 0.02 | <b>MDL:</b> 0.10 |
|              | <b>Limit:</b> 0.50   |       | <b>Limit:</b> 0.10              | <b>MRL:</b> 0.40 |





## Method Blanks & Reporting Limits

**Batch:** B173243  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Al

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173243-BLK1    | 0.031  | µg/L  |                   |
| B173243-BLK2    | -0.025 | µg/L  |                   |
| B173243-BLK3    | 0.006  | µg/L  |                   |
| B173243-BLK4    | -0.014 | µg/L  |                   |
| <b>Average:</b> | 0.000  |       | <b>MDL:</b> 0.500 |
| <b>Limit:</b>   | 2.000  |       | <b>MRL:</b> 2.00  |

**Analyte:** As

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173243-BLK1    | -0.027 | µg/L  |                   |
| B173243-BLK2    | -0.024 | µg/L  |                   |
| B173243-BLK3    | -0.032 | µg/L  |                   |
| B173243-BLK4    | -0.024 | µg/L  |                   |
| <b>Average:</b> | -0.027 |       | <b>MDL:</b> 0.011 |
| <b>Limit:</b>   | 0.040  |       | <b>MRL:</b> 0.040 |

**Analyte:** Ca

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B173243-BLK1    | -0.052 | µg/L  |                  |
| B173243-BLK2    | -0.194 | µg/L  |                  |
| B173243-BLK3    | -0.136 | µg/L  |                  |
| B173243-BLK4    | -0.071 | µg/L  |                  |
| <b>Average:</b> | -0.113 |       | <b>MDL:</b> 4.60 |
| <b>Limit:</b>   | 13.800 |       | <b>MRL:</b> 13.8 |



## Method Blanks & Reporting Limits

### Analyte: Cu

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173243-BLK1    | 0.008        | µg/L  |                   |
| B173243-BLK2    | 0.006        | µg/L  |                   |
| B173243-BLK3    | 0.002        | µg/L  |                   |
| B173243-BLK4    | 0.005        | µg/L  |                   |
| <b>Average:</b> | <b>0.005</b> |       | <b>MDL: 0.022</b> |
| <b>Limit:</b>   | <b>0.066</b> |       | <b>MRL: 0.066</b> |

### Analyte: Fe

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173243-BLK1    | 0.06        | µg/L  |                  |
| B173243-BLK2    | -0.004      | µg/L  |                  |
| B173243-BLK3    | -0.007      | µg/L  |                  |
| B173243-BLK4    | 0.02        | µg/L  |                  |
| <b>Average:</b> | <b>0.02</b> |       | <b>MDL: 0.28</b> |
| <b>Limit:</b>   | <b>0.85</b> |       | <b>MRL: 0.85</b> |

### Analyte: K

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173243-BLK1    | -0.006      | µg/L  |                  |
| B173243-BLK2    | -0.1        | µg/L  |                  |
| B173243-BLK3    | -0.02       | µg/L  |                  |
| B173243-BLK4    | -0.05       | µg/L  |                  |
| <b>Average:</b> | <b>0.0</b>  |       | <b>MDL: 2.4</b>  |
| <b>Limit:</b>   | <b>10.0</b> |       | <b>MRL: 10.0</b> |

### Analyte: Mg

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B173243-BLK1    | -0.02        | µg/L  |                  |
| B173243-BLK2    | -0.002       | µg/L  |                  |
| B173243-BLK3    | -0.0002      | µg/L  |                  |
| B173243-BLK4    | -0.008       | µg/L  |                  |
| <b>Average:</b> | <b>-0.01</b> |       | <b>MDL: 0.54</b> |
| <b>Limit:</b>   | <b>1.70</b>  |       | <b>MRL: 1.70</b> |



## Method Blanks & Reporting Limits

### Analyte: Mn

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173243-BLK1    | 0.00005       | µg/L  |                   |
| B173243-BLK2    | -0.0001       | µg/L  |                   |
| B173243-BLK3    | -0.002        | µg/L  |                   |
| B173243-BLK4    | -0.001        | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.040</b>  |       | <b>MRL: 0.040</b> |

### Analyte: Na

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B173243-BLK1    | -1.41         | µg/L  |                  |
| B173243-BLK2    | -1.77         | µg/L  |                  |
| B173243-BLK3    | -1.03         | µg/L  |                  |
| B173243-BLK4    | -1.32         | µg/L  |                  |
| <b>Average:</b> | <b>-1.385</b> |       | <b>MDL: 2.30</b> |
| <b>Limit:</b>   | <b>4.600</b>  |       | <b>MRL: 4.60</b> |

### Analyte: Si

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173243-BLK1    | 0.57        | µg/L  |                  |
| B173243-BLK2    | 0.36        | µg/L  |                  |
| B173243-BLK3    | 0.47        | µg/L  |                  |
| B173243-BLK4    | 0.55        | µg/L  |                  |
| <b>Average:</b> | <b>0.49</b> |       | <b>MDL: 0.80</b> |
| <b>Limit:</b>   | <b>4.00</b> |       | <b>MRL: 4.00</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744050-01              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-126+90-3-103117      |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Bottle FLPE Hg-T        | 250mL       |                             | none                   | n/a          |                              | Cooler - 1744050   |
| B                                      | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| C                                      | Bottle HDPE ICP-ChelCol | 60mL        |                             | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |
| <b>Lab ID:</b> 1744050-02              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                    |
| <b>Sample:</b> GW-126+90-3-103117-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1744050   |
| B                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1744050   |
| C                                      | Bottle FLPE Hg-T        | 250mL       |                             | none                   | n/a          |                              | Cooler - 1744050   |
| D                                      | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| E                                      | Bottle HDPE ICP-ChelCol |             |                             | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |
| <b>Lab ID:</b> 1744050-03              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                    |
| <b>Sample:</b> GW-126+90-3-103117-(01) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Bottle FLPE Hg-T        | 250mL       |                             | none                   | n/a          |                              | Cooler - 1744050   |
| B                                      | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| C                                      | Bottle HDPE ICP-ChelCol | 60mL        |                             | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744050-04              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/31/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-126+90-3-103117-(21) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1744050   |
| B                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1744050   |
| C                                      | Bottle FLPE Hg-T        | 250mL       |                             | none                   | n/a          |                              | Cooler - 1744050   |
| D                                      | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| E                                      | Bottle HDPE ICP-ChelCol |             |                             | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-05         |                         |             | <b>Report Matrix:</b> Water |                      |              | <b>Collected:</b> 10/31/2017 |                    |
|-----------------------------------|-------------------------|-------------|-----------------------------|----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-120+75-2-103117 |                         |             | <b>Sample Type:</b> Sample  |                      |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>  | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                 | Bottle FLPE Hg-T        | 250mL       |                             | none                 | n/a          |                              | Cooler - 1744050   |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 1% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| C                                 | Bottle HDPE ICP-ChelCol | 60mL        |                             | 1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744050-06              |                         | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 10/31/2017 |              |           |                    |
|--|-------------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-120+75-2-103117-(20) |                         | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |              |           |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                      | Vacutainer              | 6mL                         | 16-0257    | EDTA (PP)                    |              |           | Cooler - 1744050   |
| B                                      | EXTRA_VOL               | 6mL                         | 16-0257    | EDTA (PP)                    |              |           | Cooler - 1744050   |
| C                                      | Bottle FLPE Hg-T        | 250mL                       |            | none                         | n/a          |           | Cooler - 1744050   |
| D                                      | Bottle HDPE ICP-W       | 250mL                       |            | 1% HNO3 (BAL)                | 1740028      |           | Cooler - 1744050   |
| E                                      | Bottle HDPE ICP-ChelCol |                             |            | 1% Optima HNO3 (BAL)         | 1649047      |           | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-07           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 11/01/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-6G2-3-110117-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    |              |           | Cooler - 1744050   |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    |              |           | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-08           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 11/01/2017 |              |           |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> GW-5G1-3-110117-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |              |           |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    |              |           | Cooler - 1744050   |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    |              |           | Cooler - 1744050   |

**Comments:** Sample spilled

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|                                     |                  |                             |            |                              |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1744050-09           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 11/01/2017 |                    |
| <b>Sample:</b> GW-5H1-1-110117-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b>       |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
|                                     |                  |                             |            |                              | <b>pH</b>          |
|                                     |                  |                             |            |                              | <b>Ship. Cont.</b> |
|                                     |                  |                             |            |                              | Cooler - 1744050   |
|                                     |                  |                             |            |                              | Cooler - 1744050   |

|                                     |                  |                             |            |                              |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1744050-10           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 11/01/2017 |                    |
| <b>Sample:</b> GW-4G1-1-110117-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b>       |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
|                                     |                  |                             |            |                              | <b>pH</b>          |
|                                     |                  |                             |            |                              | <b>Ship. Cont.</b> |
|                                     |                  |                             |            |                              | Cooler - 1744050   |
|                                     |                  |                             |            |                              | Cooler - 1744050   |

|                                     |                  |                             |            |                              |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1744050-11           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 11/01/2017 |                    |
| <b>Sample:</b> GW-5H2-2-110117-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b>       |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
|                                     |                  |                             |            |                              | <b>pH</b>          |
|                                     |                  |                             |            |                              | <b>Ship. Cont.</b> |
|                                     |                  |                             |            |                              | Cooler - 1744050   |
|                                     |                  |                             |            |                              | Cooler - 1744050   |

|                                     |                  |                             |            |                              |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1744050-12           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 11/01/2017 |                    |
| <b>Sample:</b> GW-4G2-2-110117-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b>       |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
|                                     |                  |                             |            |                              | <b>pH</b>          |
|                                     |                  |                             |            |                              | <b>Ship. Cont.</b> |
|                                     |                  |                             |            |                              | Cooler - 1744050   |
|                                     |                  |                             |            |                              | Cooler - 1744050   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744050-13           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 11/01/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-4H3-1-110117-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 11/02/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6mL                         | 16-0257 | EDTA (PP)                    |       |    | Cooler - 1744050 |
| B                                   | EXTRA_VOL  | 6mL                         | 16-0257 | EDTA (PP)                    |       |    | Cooler - 1744050 |

| <b>Lab ID:</b> 1744050-14           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 11/01/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-5I2-1-110117-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 11/02/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6mL                         | 16-0257 | EDTA (PP)                    |       |    | Cooler - 1744050 |
| B                                   | EXTRA_VOL  | 6mL                         | 16-0257 | EDTA (PP)                    |       |    | Cooler - 1744050 |

| <b>Lab ID:</b> 1744050-15           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 11/01/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-4H4-2-110117-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 11/02/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6mL                         | 16-0257 | EDTA (PP)                    |       |    | Cooler - 1744050 |
| B                                   | EXTRA_VOL  | 6mL                         | 16-0257 | EDTA (PP)                    |       |    | Cooler - 1744050 |

| <b>Lab ID:</b> 1744050-16           |            | <b>Report Matrix:</b> Water |         | <b>Collected:</b> 11/01/2017 |       |    |                  |
|-------------------------------------|------------|-----------------------------|---------|------------------------------|-------|----|------------------|
| <b>Sample:</b> GW-5D1-3-110117-(20) |            | <b>Sample Type:</b> Sample  |         | <b>Received:</b> 11/02/2017  |       |    |                  |
| Des                                 | Container  | Size                        | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.      |
| A                                   | Vacutainer | 6mL                         | 16-0257 | EDTA (PP)                    |       |    | Cooler - 1744050 |
| B                                   | EXTRA_VOL  | 6mL                         | 16-0257 | EDTA (PP)                    |       |    | Cooler - 1744050 |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|                                     |                  |                             |            |                              |                    |
|-------------------------------------|------------------|-----------------------------|------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1744050-17           |                  | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 11/01/2017 |                    |
| <b>Sample:</b> GW-6E7-3-110117-(20) |                  | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b>       |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)                    |                    |
|                                     |                  |                             |            |                              | <b>pH</b>          |
|                                     |                  |                             |            |                              | <b>Ship. Cont.</b> |
|                                     |                  |                             |            |                              | Cooler - 1744050   |
|                                     |                  |                             |            |                              | Cooler - 1744050   |

|                               |                  |                                  |            |                              |                    |
|-------------------------------|------------------|----------------------------------|------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1744050-18     |                  | <b>Report Matrix:</b> Water      |            | <b>Collected:</b> 11/01/2017 |                    |
| <b>Sample:</b> EB-110117-(20) |                  | <b>Sample Type:</b> Equip. Blank |            | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                    | <b>Container</b> | <b>Size</b>                      | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b>       |
| A                             | Vacutainer       | 6mL                              | 16-0257    | EDTA (PP)                    |                    |
| B                             | EXTRA_VOL        | 6mL                              | 16-0257    | EDTA (PP)                    |                    |
|                               |                  |                                  |            |                              | <b>pH</b>          |
|                               |                  |                                  |            |                              | <b>Ship. Cont.</b> |
|                               |                  |                                  |            |                              | Cooler - 1744050   |
|                               |                  |                                  |            |                              | Cooler - 1744050   |

|                                   |                         |                             |            |                              |                    |
|-----------------------------------|-------------------------|-----------------------------|------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1744050-19         |                         | <b>Report Matrix:</b> Water |            | <b>Collected:</b> 11/02/2017 |                    |
| <b>Sample:</b> GW-122+60-2-110217 |                         | <b>Sample Type:</b> Sample  |            | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b>       |
| A                                 | Bottle FLPE Hg-T        | 250mL                       |            | none                         | n/a                |
| B                                 | Bottle HDPE ICP-W       | 250mL                       |            | 1% HNO3 (BAL)                | 1740028            |
| C                                 | Bottle HDPE ICP-ChelCol | 60mL                        |            | 0.1% Optima HNO3 (BAL)       | 1649047            |
|                                   |                         |                             |            |                              | <b>pH</b>          |
|                                   |                         |                             |            |                              | <b>Ship. Cont.</b> |
|                                   |                         |                             |            |                              | Cooler - 1744050   |
|                                   |                         |                             |            |                              | Cooler - 1744050   |
|                                   |                         |                             |            |                              | Cooler - 1744050   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744050-20              |                         |             | <b>Report Matrix:</b> Water |                      |              | <b>Collected:</b> 11/02/2017 |                    |
|--|-------------------------|-------------|-----------------------------|----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-122+60-2-110217-(20) |                         |             | <b>Sample Type:</b> Sample  |                      |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>  | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)            |              |                              | Cooler - 1744050   |
| B                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)            |              |                              | Cooler - 1744050   |
| C                                      | Bottle FLPE Hg-T        | 250mL       |                             | none                 | n/a          |                              | Cooler - 1744050   |
| D                                      | Bottle HDPE ICP-W       | 250mL       |                             | 1% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| E                                      | Bottle HDPE ICP-ChelCol |             |                             | 1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-21         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/02/2017 |                    |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-126+90-1-110217 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                 | Bottle FLPE Hg-T        | 250mL       |                             | none                   | n/a          |                              | Cooler - 1744050   |
| B                                 | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| C                                 | Bottle HDPE ICP-ChelCol | 60mL        |                             | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744050-22              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/02/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-126+90-1-110217-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1744050   |
| B                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1744050   |
| C                                      | Bottle FLPE Hg-T        | 250mL       |                             | none                   | n/a          |                              | Cooler - 1744050   |
| D                                      | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| E                                      | Bottle HDPE ICP-ChelCol |             |                             | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-23       |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/02/2017 |                    |
|---------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-5B1-3R-110217 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                      | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                               | Bottle FLPE Hg-T        | 250mL       |                             | none                   | n/a          |                              | Cooler - 1744050   |
| B                               | Bottle HDPE ICP-W       | 250mL       |                             | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| C                               | Bottle HDPE ICP-ChelCol | 60mL        |                             | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1744050-24

**Sample:** GW-5B1-3R-110217-(20)

**Report Matrix:** Water  
**Sample Type:** Sample

**Collected:** 11/02/2017  
**Received:** 11/02/2017

| <b>Des</b> | <b>Container</b>        | <b>Size</b> | <b>Lot</b> | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b>  |
|------------|-------------------------|-------------|------------|---------------------------|--------------|-----------|---------------------|
| A          | Vacutainer              | 6mL         | 16-0257    | EDTA (PP)                 |              |           | Cooler -<br>1744050 |
| B          | EXTRA_VOL               | 6mL         | 16-0257    | EDTA (PP)                 |              |           | Cooler -<br>1744050 |
| C          | Bottle FLPE Hg-T        | 250mL       |            | none                      | n/a          |           | Cooler -<br>1744050 |
| D          | Bottle HDPE ICP-W       | 250mL       |            | 0.2% HNO3 (BAL)           | 1740028      |           | Cooler -<br>1744050 |
| E          | Bottle HDPE ICP-ChelCol |             |            | 0.1% Optima HNO3<br>(BAL) | 1649047      |           | Cooler -<br>1744050 |

**Lab ID:** 1744050-25

**Sample:** GW-4B2-3-110217

**Report Matrix:** Water  
**Sample Type:** Sample

**Collected:** 11/02/2017  
**Received:** 11/02/2017

| <b>Des</b> | <b>Container</b>        | <b>Size</b> | <b>Lot</b> | <b>Preservation</b>     | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b>  |
|------------|-------------------------|-------------|------------|-------------------------|--------------|-----------|---------------------|
| A          | Bottle FLPE Hg-T        | 250mL       |            | none                    | n/a          |           | Cooler -<br>1744050 |
| B          | Bottle HDPE ICP-W       | 250mL       |            | 0.2% HNO3 (BAL)         | 1740028      |           | Cooler -<br>1744050 |
| C          | Bottle HDPE ICP-ChelCol | 60mL        |            | 1% Optima HNO3<br>(BAL) | 1649047      |           | Cooler -<br>1744050 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744050-26           |                         | <b>Report Matrix:</b> Water |            |                      |              | <b>Collected:</b> 11/02/2017 |                    |
|-------------------------------------|-------------------------|-----------------------------|------------|----------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-4B2-3-110217-(20) |                         | <b>Sample Type:</b> Sample  |            |                      |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                          | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>  | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Vacutainer              | 6mL                         | 16-0257    | EDTA (PP)            |              |                              | Cooler - 1744050   |
| B                                   | EXTRA_VOL               | 6mL                         | 16-0257    | EDTA (PP)            |              |                              | Cooler - 1744050   |
| C                                   | Bottle FLPE Hg-T        | 250mL                       |            | none                 | n/a          |                              | Cooler - 1744050   |
| D                                   | Bottle HDPE ICP-W       | 250mL                       |            | 0.2% HNO3 (BAL)      | 1740028      |                              | Cooler - 1744050   |
| E                                   | Bottle HDPE ICP-ChelCol |                             |            | 1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-27           |                  | <b>Report Matrix:</b> Water |            |                     |              | <b>Collected:</b> 11/02/2017 |                    |
|-------------------------------------|------------------|-----------------------------|------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-4B1-3-110217-(20) |                  | <b>Sample Type:</b> Sample  |            |                     |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                          | <b>Container</b> | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Vacutainer       | 6mL                         | 16-0257    | EDTA (PP)           |              |                              | Cooler - 1744050   |
| B                                   | EXTRA_VOL        | 6mL                         | 16-0257    | EDTA (PP)           |              |                              | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-28            |                         | <b>Report Matrix:</b> Water |            |                        |              | <b>Collected:</b> 11/02/2017 |                    |
|--------------------------------------|-------------------------|-----------------------------|------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-3A1-3R-110217-(20) |                         | <b>Sample Type:</b> Sample  |            |                        |              | <b>Received:</b> 11/02/2017  |                    |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | Vacutainer              | 6mL                         | 16-0257    | EDTA (PP)              |              |                              | Cooler - 1744050   |
| B                                    | EXTRA_VOL               | 6mL                         | 16-0257    | EDTA (PP)              |              |                              | Cooler - 1744050   |
| C                                    | Bottle FLPE Hg-T        | 250mL                       |            | none                   | n/a          |                              | Cooler - 1744050   |
| D                                    | Bottle HDPE ICP-W       | 250mL                       |            | 0.2% HNO3 (BAL)        | 1740028      |                              | Cooler - 1744050   |
| E                                    | Bottle HDPE ICP-ChelCol |                             |            | 0.1% Optima HNO3 (BAL) | 1649047      |                              | Cooler - 1744050   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1744050-29<br><b>Sample:</b> GW-3A1-3R-110217 |                         |             | <b>Report Matrix:</b> Water<br><b>Sample Type:</b> Sample |                        |              | <b>Collected:</b> 11/02/2017<br><b>Received:</b> 11/02/2017 |                    |
|--|-------------------------|-------------|---|------------------------|--------------|---|--------------------|
| <b>Des</b>   | <b>Container</b>        | <b>Size</b> | <b>Lot</b>  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>   | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 250mL       |   | none                   | n/a          |   | Cooler - 1744050   |
| B  | Bottle HDPE ICP-W       | 250mL       |   | 0.2% HNO3 (BAL)        | 1740028      |   | Cooler - 1744050   |
| C  | Bottle HDPE ICP-ChelCol | 60mL        |   | 0.1% Optima HNO3 (BAL) | 1649047      |   | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-30<br><b>Sample:</b> EB-110217 |                  |             | <b>Report Matrix:</b> Water<br><b>Sample Type:</b> Equip. Blank |                     |              | <b>Collected:</b> 11/02/2017<br><b>Received:</b> 11/02/2017 |                    |
|---|------------------|-------------|---|---------------------|--------------|---|--------------------|
| <b>Des</b>  | <b>Container</b> | <b>Size</b> | <b>Lot</b>  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>   | <b>Ship. Cont.</b> |
| A   | Vacutainer       | 6mL         | 16-0257   | EDTA (PP)           |              |   | Cooler - 1744050   |
| B   | EXTRA_VOL        | 6mL         | 16-0257   | EDTA (PP)           |              |   | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-31<br><b>Sample:</b> GW-7E5-3-110217-(20) |                  |             | <b>Report Matrix:</b> Water<br><b>Sample Type:</b> Sample |                     |              | <b>Collected:</b> 11/02/2017<br><b>Received:</b> 11/02/2017 |                    |
|--|------------------|-------------|---|---------------------|--------------|---|--------------------|
| <b>Des</b>   | <b>Container</b> | <b>Size</b> | <b>Lot</b>  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>   | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6mL         | 16-0257   | EDTA (PP)           |              |   | Cooler - 1744050   |
| B  | EXTRA_VOL        | 6mL         | 16-0257   | EDTA (PP)           |              |   | Cooler - 1744050   |

| <b>Lab ID:</b> 1744050-32<br><b>Sample:</b> GW-6E8-3-110217-(20) |                  |             | <b>Report Matrix:</b> Water<br><b>Sample Type:</b> Sample |                     |              | <b>Collected:</b> 11/02/2017<br><b>Received:</b> 11/02/2017 |                    |
|--|------------------|-------------|---|---------------------|--------------|---|--------------------|
| <b>Des</b>   | <b>Container</b> | <b>Size</b> | <b>Lot</b>  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>   | <b>Ship. Cont.</b> |
| A  | Vacutainer       | 6mL         | 16-0257   | EDTA (PP)           |              |   | Cooler - 1744050   |
| B  | EXTRA_VOL        | 6mL         | 16-0257   | EDTA (PP)           |              |   | Cooler - 1744050   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1744050  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### **Cooler - 1744050**

**Received:** November 2, 2017 15:20  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 6.8 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

BAL Report 1744050

Received by: Mary For BAL use only Date: 11/2/17

Work Order ID: \_\_\_\_\_ Time: 15:20

Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF)

PO Number: 79224

Contact: Troy Bussey (PIONEER)

Phone: 360-570-1700

Client Project ID: Arkema FS DG Inv

Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to:

Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to:

Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes

BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |                      | Client Sample Info |                      |                 |                                 | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|----------------------|--------------------|----------------------|-----------------|---------------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type               | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          | Specify Here                         |
| 1  | GW-126+90-3-103117                      | 10-31-17             | 1215               | water                | 3               | N                               | N  |   |   |   | X   |   |  |          | 2MS                                  |
| 2  | GW-126+90-3-103117-(20)                 |                      | 1215               |                      | 5               | Y                               |  |   |   |   |   | X   | X  | X        | 2MS                                  |
| 3  | GW-126+90-3-103117-(01)                 |                      | 1220               |                      | 3               | Y                               |  |   |   | X   |   |   |  |          | 2MS                                  |
| 4  | GW-126+90-3-103117-(21)                 |                      | 1220               |                      | 5               | Y                               |  |   |   |   | X   | X   | X  |          | 2MS                                  |
| 5  | GW-120+75-2-103117                      |                      | 1300               |                      | 3               | Y                               |  |   |   | X   |   |   |  |          | 33MS                                 |
| 6  | GW-120+75-2-103117-(20)                 |                      | 1300               |                      | 5               | Y                               |  |   |   |   | X   | X   | X  |          | 33MS                                 |
| 7  | GW-662-3-110117-(20)                    | 11-01-17             | 9:15               |                      | 2               | Y                               |  |   |   |   |   | X   |  |          | 3MS                                  |
| 8  | GW-561-3-110117-(20)                    |                      | 9:20               |                      | 2               | Y                               |  |   |   |   |   | X   |  |          | 10MS                                 |
| 9  | GW-511-1-110117-(20)                    |                      | 10:55              |                      | 2               | Y                               |  |   |   |   |   | X   |  |          | 1MS                                  |
| 10   | GW-461-1-110117-(20)                    |                      | 10:50              |                      | 2               | Y                               |  |   |   |   |   | X   |  |          | 1MS                                  |
| Trip Blank (specify)   |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>[Signature]</u>  |   | Date: <u>11/2/17</u> |                    | Time: <u>1520</u>    |                 | Relinquished By: _____          |  |   |   | Date: _____   |   | Time: _____   |  |          |                                      |
| Received By: _____   |   | Date: _____          |                    | Time: _____          |                 | Total Number of Packages: _____ |  |   |   |   |   |   |  |          |                                      |

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# Chain-of-Custody Form

BAL Report 1744050

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: Maute For BAL use only Date: 11/2/17  
Work Order ID: \_\_\_\_\_ Time: 15:20  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503  
Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection           |                         | Client Sample Info |                      |                 |                                 |  | BRL Analyses Required   |   |   |   |   |  |                                      | Comments     |
|--|----------------------|-------------------------|--------------------|----------------------|-----------------|---------------------------------|--|---|---|---|---|---|--|--------------------------------------|--------------|
|  | Date                 | Time                    | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type               | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6920 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 | Note: Field conductivity measurement |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID            |                         |                    |                      |                 |                                 |  |   |   |   |   |   |  |                                      | Specify Here |
|  | 1                    | GW-5H2-2-110117-(20)    | 11-01-17           | 1210                 | Water           | 2                               | Y  | Z   |   |   |   | X   |  |                                      | 13MS         |
|  | 2                    | GW-4G2-2-110117-(20)    | 11-01-17           | 1150                 |                 |                                 |  |   |   |   |   |   |  |                                      | 3MS          |
|  | 3                    | GW-4H3-1-110117-(20)    | 11-01-17           | 1235                 |                 |                                 |  |   |   |   |   |   |  |                                      | 19MS         |
|  | 4                    | GW-5I2-1-110117-(20)    |                    | 1315                 |                 |                                 |  |   |   |   |   |   |  |                                      | 19MS         |
|  | 5                    | GW-4H4-2-110117-(20)    |                    | 1350                 |                 |                                 |  |   |   |   |   |   |  |                                      | 12MS         |
|  | 6                    | GW-5D1-3-110117-(20)    |                    | 1500                 |                 |                                 |  |   |   |   |   |   |  |                                      | 25MS         |
|  | 7                    | GW-6E7-3-110117-(20)    |                    | 1505                 |                 |                                 |  |   |   |   |   |   |  |                                      | 4MS          |
|  | 8                    | EB-110117-(20)          |                    | 1430                 |                 |                                 |  |   |   |   |   |   |  |                                      | /            |
|  | 9                    | GW-122+60-2-110217      | 11-02-17           | 820                  |                 |                                 |  |   | X   |   |   |   |  |                                      | 31MS         |
|  | 10                   | GW-122+60-2-110217-(20) | 11-02-17           | 820                  |                 |                                 |  |   |   |   | X   | X   | X  |                                      | 31MS         |
|  | Trip Blank (specify) |                         |                    |                      |                 |                                 |  |   |   |   |   |   |  |                                      |              |
| Relinquished By: <u>Maute</u>  |                      | Date: <u>11/2/17</u>    |                    | Time: <u>1520</u>    |                 | Relinquished By: _____          |  |   |   |   | Date: _____   |   | Time: _____  |                                      |              |
| Received By: _____   |                      | Date: _____             |                    | Time: _____          |                 | Total Number of Packages: _____ |  |   |   |   |   |   |  |                                      |              |

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# Chain-of-Custody Form

BAL Report 1744050

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: me For BAL use only Date: 11/2/07  
Work Order ID: \_\_\_\_\_ Time: 15:20  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503  
Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection           |                         | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|----------------------|-------------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                 | Time                    | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID            |                         |                                 |                      |                 |                   |  |   |   |   |   |   |  |          | Specify Here                         |
|   | 1                    | GW-126+90-1-110217      | 1102-17                         | 945                  | Water           | 3                 | Z  | Z   |   |   | X   |   |  |          | 20 MS                                |
|   | 2                    | GW-126+90-1-110217-(20) |                                 | 945                  |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 20 MS                                |
|   | 3                    | GW-5B1-3R-110217        |                                 | 930                  |                 | 3                 | Z  |   |   | X   |   |   |  |          | 3 MS                                 |
|   | 4                    | GW-5B1-3R-110217-(20)   |                                 | 930                  |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 3 MS                                 |
|   | 5                    | GW-4B2-3-110217         |                                 | 940                  |                 | 3                 | Z  |   |   | X   |   |   |  |          | 46 MS                                |
|   | 6                    | GW-4B2-3-110217-(20)    |                                 | 940                  |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 46 MS                                |
|   | 7                    | GW-4B1-3-110217-(20)    |                                 | 1030                 |                 | 2                 | Y  |   |   |   |   | X   |  |          | 13 MS                                |
|   | 8                    | GW-3A1-3R-110217-(20)   |                                 | 1040                 |                 | 5                 | Y  |   |   |   | X   | X   | X  |          | 3 MS                                 |
|   | 9                    | GW-3A1-3R-110217        |                                 | 1040                 |                 | 3                 | Z  |   |   | X   |   |   |  |          | 3 MS                                 |
|   | 10                   | EB-110217               |                                 | 1145                 |                 | 2                 | Y  |   |   |   |   | X   |  |          | /                                    |
|   | Trip Blank (specify) |                         |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>LH</u>  | Date: <u>11/2/07</u> | Time: <u>1520</u>       | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |                                      |
| Received By: _____  | Date: _____          | Time: _____             | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |

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# Chain-of-Custody Form

BAL Report 1744050

Received by: Man For BAL use only Date: 11/2/17  
 Work Order ID: \_\_\_\_\_ Time: 15:20  
 Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 \*Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)   | Collection           |                      | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|----------------------|----------------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                 | Time                 | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 4020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID            |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          | Specify Here                         |
|   | 1                    | GW-7E5-3-110217-(20) | 11-2-17                   | 1305                 | Water           | 2                 | Y  | N   |   |   |   | X   |  |          | 1MS                                  |
|   | 2                    | GW-6E8-3-110217-(20) | ↓                         | 1310                 | ↓               | ↓                 | ↓  | ↓   |   |   |   | X   |  |          | 2MS                                  |
|   | 3                    |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 4                    |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 5                    |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 6                    |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 7                    |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 8                    |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 9                    |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 10                   |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | Trip Blank (specify) |                      |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Y L</u>   | Date: <u>11/2/17</u> | Time: <u>1520</u>    | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |  |          |                                      |
| Received By:  | Date:                | Time:                | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |

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18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

January 12, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On November 6, 2017, Brooks Applied Labs (BAL) received twenty (20) water samples in a sealed container with a temperature of 5.1°C. The samples were logged-in for the total recoverable and dissolved metals (aluminum [Al], arsenic [As], calcium [Ca], iron [Fe], potassium [K], magnesium [Mg], manganese [Mg], sodium [Na], and silicon [Si]) analyses via digestion and subsequent analysis by modified EPA Method 1638. The silicon results are operationally defined as nitric acid-soluble [Si]. The samples were logged in for total recoverable and dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. In cases where an analytical bias is observed for (copper [Cu], lead [Pb], or nickel [Ni]) analyses by modified EPA Method 1640, the copper, lead, and/or nickel results are quantified and reported via modified EPA Method 1638. The samples were logged-in for the total mercury [Hg] analysis by EPA Method 1631E. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody (COC) forms.

The samples submitted for arsenic speciation and dissolved analyses were filtered in the field by the client.

At the request of the client, the sample listed on the COC as *GW-IC1-3* was later changed to *GW-IC1-3-110317-(20)*.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives was monitored for contamination to account for any biases associated with the sample results.

*Total Recoverable and Dissolved Metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, and Si) Analysis by EPA Method 1638, Mod.*

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Total recoverable and dissolved metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, and Si) quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

In some cases, higher dilutions were necessary to mitigate matrix interference on the analytical platform. In these instances, the MDLs and MRLs were elevated, and there are some cases where the target MDL/MRLs were not met as a result.

### **Batch B173243**

The blank spikes are prepared at the prep step and undergo the same preservation and oven digest as the client samples; so, the blank spike recoveries can be used to monitor the efficacy of the in-bottle oven digest on specific target analytes. The blank spikes in Batch B173243 were not spiked with silicon. Blank spike recoveries for other in-bottle oven digest batches associated with this project (not shown) were spiked with silicon and have produced acceptable recoveries. Certified reference materials (B173243-SRM1 and B173243-SRM2) containing known values of silicon were analyzed in the analytical run and the silicon recoveries were acceptable at 111% and 106%, demonstrating that the analytical method stabilizes silicon in solution. Matrix spikes and matrix spike duplicate recoveries were acceptable for silicon. Since silicon blank spikes for this method have historically yielded acceptable recoveries and the reference materials and MS/MSD silicon recoveries were acceptable, demonstrating the absence of any significant matrix induced interference on silicon results within the analytical platform. No corrective action was taken, and no qualification of data was necessary. The silicon results are reported unqualified.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. BAL requires that the MRL is at least 2 times the value of the corresponding MDL. Due to an elevated MDL, it was necessary to raise the Na MRL to 2 times the value of the MDL. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### *Total Recoverable metals (Ni, and Pb) Analysis by EPA Method 1640, Mod.*

A high bias due to the sample matrix was observed for Cu when compared to EPA Method 1638, Mod results. Consequently, Cu results are reported from EPA Method 1638, Mod analyses. Ni and Pb are reported via by EPA Method 1640, Mod.

Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid (HNO<sub>3</sub>) and then prepared according to EPA Method 1640. All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). The ICP-DRC-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

### **Batch B173038**

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Total and Dissolved Mercury Quantitation by EPA Method 1631E

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

#### **Batch B173045**

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

#### **Batch B173027**

The sum of arsenic species was greater than the corresponding dissolved arsenic result for the client sample 1745005-04. Re-analyses confirmed both dissolved arsenic and arsenic speciation results. The arsenic speciation fraction was screened for total arsenic, verifying the elevated concentrations. The container labels were checked and there was no indication of sample IDs getting switched. Since re-analyses confirmed, the arsenic speciation results for 1745005-04 are reported from Batch B173027 and results are deemed representative of the supplied samples.

All data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksapplied.com





## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.





## Sample Information

| Sample                  | Lab ID     | Report Matrix | Type         | Sampled    | Received   |
|-------------------------|------------|---------------|--------------|------------|------------|
| GW-121+80-1-110317      | 1745005-01 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-121+80-1-110317-(20) | 1745005-02 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-122+60-1-110317      | 1745005-03 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-122+60-1-110317-(20) | 1745005-04 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-122+60-3-110317      | 1745005-05 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-122+60-3-110317-(20) | 1745005-06 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-122+60-0-110317      | 1745005-07 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-122+60-0-110317-(20) | 1745005-08 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-124+00-3-110317      | 1745005-09 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-124+00-3-110317-(20) | 1745005-10 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-IC1-3-110317-(20)    | 1745005-11 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-125+50-3-110317      | 1745005-12 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-125+50-3-110317-(20) | 1745005-13 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-128+30-3-110317      | 1745005-14 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-128+30-3-110317-(20) | 1745005-15 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-129+65-3-110317      | 1745005-16 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-129+65-3-110317-(20) | 1745005-17 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-131-00-3-110317      | 1745005-18 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| GW-131-00-3-110317-(20) | 1745005-19 | Water         | Sample       | 11/03/2017 | 11/06/2017 |
| EB-110317               | 1745005-20 | Water         | Equip. Blank | 11/03/2017 | 11/06/2017 |



## Batch Summary

| Analyte | Lab Matrix | Method          | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|-----------------|------------|------------|---------|----------|
| Al      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| As      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| As      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/19/2017 | B173243 | 1701579  |
| As(III) | Water      | SOP BAL-4100    | 11/07/2017 | 11/09/2017 | B173027 | 1701411  |
| As(V)   | Water      | SOP BAL-4100    | 11/07/2017 | 11/09/2017 | B173027 | 1701411  |
| Ca      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Cu      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| DMAs    | Water      | SOP BAL-4100    | 11/07/2017 | 11/09/2017 | B173027 | 1701411  |
| Fe      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Hg      | Water      | EPA 1631 E      | 11/10/2017 | 11/14/2017 | B173045 | 1701418  |
| K       | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Mg      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| MMAs    | Water      | SOP BAL-4100    | 11/07/2017 | 11/09/2017 | B173027 | 1701411  |
| Mn      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Na      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |
| Ni      | Water      | EPA 1640 Column | 11/08/2017 | 11/29/2017 | B173038 | 1701466  |
| Ni      | Water      | EPA 1640 Column | 11/08/2017 | 11/30/2017 | B173038 | 1701485  |
| Pb      | Water      | EPA 1640 Column | 11/08/2017 | 11/28/2017 | B173038 | 1701466  |
| Si      | Water      | EPA 1638 Mod    | 11/08/2017 | 12/02/2017 | B173243 | 1701505  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-121+80-1-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-01                     | As      | Water         | TR    | 767     |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-01                     | Cu      | Water         | TR    | 66.9    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-01                     | Hg      | Water         | TR    | 107     |           | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1745005-01                     | Ni      | Water         | TR    | 6.62    |           | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1745005-01                     | Pb      | Water         | TR    | 14.2    |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| <b>GW-121+80-1-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-02                     | Al      | Water         | D     | 35.7    | J         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-02                     | As      | Water         | D     | 735     |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-02                     | As(III) | Water         | D     | 417     |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-02                     | As(V)   | Water         | D     | 91.9    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-02                     | Ca      | Water         | D     | 3410    |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-02                     | Cu      | Water         | D     | 1.78    | J         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-02                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-02                     | Fe      | Water         | D     | 256     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-02                     | Hg      | Water         | D     | 41.9    |           | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1745005-02                     | K       | Water         | D     | 5280    |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-02                     | Mg      | Water         | D     | 711     |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1745005-02                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-02                     | Mn      | Water         | D     | 3.25    |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-02                     | Na      | Water         | D     | 264000  |           | 93.9  | 188   | µg/L | B173243 | 1701505  |
| 1745005-02                     | Ni      | Water         | D     | 1.12    |           | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1745005-02                     | Pb      | Water         | D     | 0.632   |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-02                     | Si      | Water         | D     | 57500   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-122+60-1-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-03                     | As      | Water         | TR    | 5310    |           | 11.2  | 40.8  | µg/L | B173243 | 1701505  |
| 1745005-03                     | Cu      | Water         | TR    | 398     |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-03                     | Hg      | Water         | TR    | 45.5    |           | 0.11  | 0.42  | ng/L | B173045 | 1701418  |
| 1745005-03                     | Ni      | Water         | TR    | 2170    |           | 3.54  | 15.2  | µg/L | B173038 | 1701485  |
| 1745005-03                     | Pb      | Water         | TR    | 6.43    |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-122+60-1-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-04                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-04                     | As      | Water         | D     | 15.0    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-04                     | As(III) | Water         | D     | 0.219   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-04                     | As(V)   | Water         | D     | 20.8    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-04                     | Ca      | Water         | D     | 228000  |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-04                     | Cu      | Water         | D     | 4.37    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-04                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-04                     | Fe      | Water         | D     | 82.5    |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-04                     | Hg      | Water         | D     | 1.23    |           | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-04                     | K       | Water         | D     | 222000  |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-04                     | Mg      | Water         | D     | 617000  |           | 551   | 1730  | µg/L | B173243 | 1701505  |
| 1745005-04                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-04                     | Mn      | Water         | D     | 97.3    |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-04                     | Na      | Water         | D     | 5550000 |           | 2350  | 4690  | µg/L | B173243 | 1701505  |
| 1745005-04                     | Ni      | Water         | D     | 335     |           | 1.41  | 6.06  | µg/L | B173038 | 1701485  |
| 1745005-04                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-04                     | Si      | Water         | D     | 14600   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-122+60-3-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-05                     | As      | Water         | TR    | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-05                     | Cu      | Water         | TR    | 5.66    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-05                     | Hg      | Water         | TR    | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-05                     | Ni      | Water         | TR    | 38.5    |           | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1745005-05                     | Pb      | Water         | TR    | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-122+60-3-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-06                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-06                     | As      | Water         | D     | 2.32    | J         | 1.12  | 4.08  | µg/L | B173243 | 1701579  |
| 1745005-06                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-06                     | As(V)   | Water         | D     | 0.323   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-06                     | Ca      | Water         | D     | 149000  |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-06                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-06                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-06                     | Fe      | Water         | D     | 133     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-06                     | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-06                     | K       | Water         | D     | 51600   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-06                     | Mg      | Water         | D     | 210000  |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1745005-06                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-06                     | Mn      | Water         | D     | 134     |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-06                     | Na      | Water         | D     | 899000  |           | 2350  | 4690  | µg/L | B173243 | 1701505  |
| 1745005-06                     | Ni      | Water         | D     | 0.467   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1745005-06                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-06                     | Si      | Water         | D     | 22200   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-122+60-0-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-07                     | As      | Water         | TR    | 10.0    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-07                     | Cu      | Water         | TR    | 6.02    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-07                     | Hg      | Water         | TR    | 2.16    |           | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-07                     | Ni      | Water         | TR    | 490     |           | 1.41  | 6.06  | µg/L | B173038 | 1701485  |
| 1745005-07                     | Pb      | Water         | TR    | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-122+60-0-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-08                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-08                     | As      | Water         | D     | 9.71    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-08                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-08                     | As(V)   | Water         | D     | 9.01    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-08                     | Ca      | Water         | D     | 299000  |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-08                     | Cu      | Water         | D     | 5.90    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-08                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-08                     | Fe      | Water         | D     | 18.9    | J         | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-08                     | Hg      | Water         | D     | 2.08    |           | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-08                     | K       | Water         | D     | 273000  |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-08                     | Mg      | Water         | D     | 785000  |           | 551   | 1730  | µg/L | B173243 | 1701505  |
| 1745005-08                     | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-08                     | Mn      | Water         | D     | 6.77    |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-08                     | Na      | Water         | D     | 6680000 |           | 2350  | 4690  | µg/L | B173243 | 1701505  |
| 1745005-08                     | Ni      | Water         | D     | 515     |           | 1.41  | 6.06  | µg/L | B173038 | 1701485  |
| 1745005-08                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-08                     | Si      | Water         | D     | 6930    |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-124+00-3-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-09                     | As      | Water         | TR    | 5.63    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-09                     | Cu      | Water         | TR    | 5.72    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-09                     | Hg      | Water         | TR    | 1.15    |           | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-09                     | Ni      | Water         | TR    | 7.13    |           | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1745005-09                     | Pb      | Water         | TR    | 0.749   |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-124+00-3-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-10                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-10                     | As      | Water         | D     | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-10                     | As(III) | Water         | D     | 1.40    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-10                     | As(V)   | Water         | D     | 0.234   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-10                     | Ca      | Water         | D     | 60900   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-10                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-10                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-10                     | Fe      | Water         | D     | 852     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-10                     | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-10                     | K       | Water         | D     | 24600   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-10                     | Mg      | Water         | D     | 75900   |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1745005-10                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-10                     | Mn      | Water         | D     | 52.2    |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-10                     | Na      | Water         | D     | 273000  |           | 93.9  | 188   | µg/L | B173243 | 1701505  |
| 1745005-10                     | Ni      | Water         | D     | 0.203   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1745005-10                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-10                     | Si      | Water         | D     | 22000   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-IC1-3-110317-(20)</b>    |         |               |       |         |           |       |       |      |         |          |
| 1745005-11                     | As(III) | Water         | D     | 0.454   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-11                     | As(V)   | Water         | D     | 0.816   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-11                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-11                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| <b>GW-125+50-3-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-12                     | As      | Water         | TR    | 9.56    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-12                     | Cu      | Water         | TR    | 1.20    | J         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-12                     | Hg      | Water         | TR    | 4.85    |           | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1745005-12                     | Ni      | Water         | TR    | 1.44    |           | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1745005-12                     | Pb      | Water         | TR    | 0.230   | J         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |





## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-125+50-3-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-13                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-13                     | As      | Water         | D     | 4.93    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-13                     | As(III) | Water         | D     | 4.64    |           | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-13                     | As(V)   | Water         | D     | 0.451   | J         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-13                     | Ca      | Water         | D     | 99700   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-13                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-13                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-13                     | Fe      | Water         | D     | 1290    |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-13                     | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-13                     | K       | Water         | D     | 31400   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-13                     | Mg      | Water         | D     | 148000  |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1745005-13                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-13                     | Mn      | Water         | D     | 193     |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-13                     | Na      | Water         | D     | 263000  |           | 93.9  | 188   | µg/L | B173243 | 1701505  |
| 1745005-13                     | Ni      | Water         | D     | 0.393   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701485  |
| 1745005-13                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-13                     | Si      | Water         | D     | 22700   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-128+30-3-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-14                     | As      | Water         | TR    | 4.83    |           | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-14                     | Cu      | Water         | TR    | 25.4    |           | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-14                     | Hg      | Water         | TR    | 13.7    |           | 0.10  | 0.41  | ng/L | B173045 | 1701418  |
| 1745005-14                     | Ni      | Water         | TR    | 15.5    |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1745005-14                     | Pb      | Water         | TR    | 3.55    |           | 0.101 | 0.303 | µg/L | B173038 | 1701466  |





## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-128+30-3-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-15                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-15                     | As      | Water         | D     | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-15                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-15                     | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-15                     | Ca      | Water         | D     | 35600   |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-15                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-15                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-15                     | Fe      | Water         | D     | 648     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-15                     | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-15                     | K       | Water         | D     | 14300   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-15                     | Mg      | Water         | D     | 45400   |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1745005-15                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-15                     | Mn      | Water         | D     | 31.8    |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-15                     | Na      | Water         | D     | 226000  |           | 93.9  | 188   | µg/L | B173243 | 1701505  |
| 1745005-15                     | Ni      | Water         | D     | 0.220   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1745005-15                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-15                     | Si      | Water         | D     | 22700   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-129+65-3-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-16                     | As      | Water         | TR    | 2.67    | J         | 1.12  | 4.08  | µg/L | B173243 | 1701579  |
| 1745005-16                     | Cu      | Water         | TR    | 1.27    | J         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-16                     | Hg      | Water         | TR    | 1.84    |           | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-16                     | Ni      | Water         | TR    | 3.43    |           | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1745005-16                     | Pb      | Water         | TR    | 0.132   | J         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-129+65-3-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-17                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-17                     | As      | Water         | D     | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-17                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-17                     | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-17                     | Ca      | Water         | D     | 161000  |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-17                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-17                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-17                     | Fe      | Water         | D     | 694     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-17                     | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-17                     | K       | Water         | D     | 35700   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-17                     | Mg      | Water         | D     | 190000  |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1745005-17                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-17                     | Mn      | Water         | D     | 107     |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-17                     | Na      | Water         | D     | 737000  |           | 2350  | 4690  | µg/L | B173243 | 1701505  |
| 1745005-17                     | Ni      | Water         | D     | 0.210   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1745005-17                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-17                     | Si      | Water         | D     | 32000   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>GW-131-00-3-110317</b>      |         |               |       |         |           |       |       |      |         |          |
| 1745005-18                     | As      | Water         | TR    | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-18                     | Cu      | Water         | TR    | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-18                     | Hg      | Water         | TR    | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-18                     | Ni      | Water         | TR    | 0.346   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1745005-18                     | Pb      | Water         | TR    | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>GW-131-00-3-110317-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1745005-19                     | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173243 | 1701505  |
| 1745005-19                     | As      | Water         | D     | ≤ 0.449 | U         | 0.449 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-19                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-19                     | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-19                     | Ca      | Water         | D     | 120000  |           | 188   | 563   | µg/L | B173243 | 1701505  |
| 1745005-19                     | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173243 | 1701505  |
| 1745005-19                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-19                     | Fe      | Water         | D     | 921     |           | 11.4  | 34.7  | µg/L | B173243 | 1701505  |
| 1745005-19                     | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173045 | 1701418  |
| 1745005-19                     | K       | Water         | D     | 30100   |           | 98.0  | 408   | µg/L | B173243 | 1701505  |
| 1745005-19                     | Mg      | Water         | D     | 128000  |           | 22.0  | 69.4  | µg/L | B173243 | 1701505  |
| 1745005-19                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |
| 1745005-19                     | Mn      | Water         | D     | 149     |           | 0.163 | 1.63  | µg/L | B173243 | 1701505  |
| 1745005-19                     | Na      | Water         | D     | 309000  |           | 93.9  | 188   | µg/L | B173243 | 1701505  |
| 1745005-19                     | Ni      | Water         | D     | 0.175   | J         | 0.141 | 0.606 | µg/L | B173038 | 1701466  |
| 1745005-19                     | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173038 | 1701466  |
| 1745005-19                     | Si      | Water         | D     | 22200   |           | 32.7  | 163   | µg/L | B173243 | 1701505  |
| <b>EB-110317</b>               |         |               |       |         |           |       |       |      |         |          |
| 1745005-20                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-20                     | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173027 | 1701411  |
| 1745005-20                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173027 | 1701411  |
| 1745005-20                     | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173027 | 1701411  |



## Accuracy & Precision Summary

Batch: B173027  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173027-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.583  | µg/L  | 111% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 5.341  | µg/L  | 107% 75-125  |              |
|              | DMAs  |        | 3.198 | 3.198  | µg/L  | 100% 75-125  |              |
| B173027-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMAAs                                       |        | 4.634 | 4.859  | µg/L  | 105% 75-125  |              |
| B173027-DUP6 | <b>Duplicate, (1745005-04)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | 0.219  |       | ND     | µg/L  |              | N/C 25       |
|              | As(V)                                       | 20.75  |       | 21.30  | µg/L  |              | 3% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B173027-MS6  | <b>Matrix Spike, (1745005-04)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | 0.219  | 50.00 | 47.73  | µg/L  | 95% 75-125   |              |
|              | As(V)                                       | 20.75  | 50.00 | 69.31  | µg/L  | 97% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 49.78  | µg/L  | 98% 75-125   |              |
|              | MMAAs                                       | ND     | 50.00 | 47.31  | µg/L  | 95% 75-125   |              |
| B173027-MSD6 | <b>Matrix Spike Duplicate, (1745005-04)</b> |        |       |        |       |              |              |
|              | As(III)                                     | 0.219  | 50.00 | 48.17  | µg/L  | 96% 75-125   | 0.9% 25      |
|              | As(V)                                       | 20.75  | 50.00 | 69.70  | µg/L  | 98% 75-125   | 0.6% 25      |
|              | DMAs  | ND     | 51.00 | 50.32  | µg/L  | 99% 75-125   | 1% 25        |
|              | MMAAs                                       | ND     | 50.00 | 47.57  | µg/L  | 95% 75-125   | 0.6% 25      |
| B173027-DUP7 | <b>Duplicate, (1745005-19)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | As(V)                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B173027-MS7  | <b>Matrix Spike, (1745005-19)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 46.44  | µg/L  | 93% 75-125   |              |
|              | As(V)                                       | ND     | 50.00 | 47.74  | µg/L  | 95% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 47.99  | µg/L  | 94% 75-125   |              |
|              | MMAAs                                       | ND     | 50.00 | 46.99  | µg/L  | 94% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173027  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B173027-MSD7 | Matrix Spike Duplicate, (1745005-19) |        |       |        |       |              |              |
|              | As(III)                              | ND     | 50.00 | 46.03  | µg/L  | 92% 75-125   | 0.9% 25      |
|              | As(V)                                | ND     | 50.00 | 47.62  | µg/L  | 95% 75-125   | 0.2% 25      |
|              | DMAs                                 | ND     | 51.00 | 48.69  | µg/L  | 95% 75-125   | 1% 25        |
|              | MMA                                  | ND     | 50.00 | 47.34  | µg/L  | 95% 75-125   | 0.7% 25      |



## Accuracy & Precision Summary

Batch: B173038  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte                              | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|--------|--------|-------|--------------|--------------|
| B173038-BS1  | Blank Spike, (1722014)               |        |        |        |       |              |              |
|              | Ni                                   |        | 0.5000 | 0.4684 | µg/L  | 94% 75-125   |              |
|              | Pb                                   |        | 0.5000 | 0.5143 | µg/L  | 103% 75-125  |              |
| B173038-BS2  | Blank Spike, (1722014)               |        |        |        |       |              |              |
|              | Ni                                   |        | 0.5000 | 0.4753 | µg/L  | 95% 75-125   |              |
|              | Pb                                   |        | 0.5000 | 0.5123 | µg/L  | 102% 75-125  |              |
| B173038-DUP2 | Duplicate, (1744050-29)              |        |        |        |       |              |              |
|              | Pb                                   | ND     |        | ND     | µg/L  |              | N/C 20       |
| B173038-MS2  | Matrix Spike, (1744050-29)           |        |        |        |       |              |              |
|              | Pb                                   | ND     | 10.10  | 10.96  | µg/L  | 109% 75-125  |              |
| B173038-MSD2 | Matrix Spike Duplicate, (1744050-29) |        |        |        |       |              |              |
|              | Pb                                   | ND     | 10.10  | 10.99  | µg/L  | 109% 75-125  | 0.3% 20      |
| B173038-DUP6 | Duplicate, (1745005-03)              |        |        |        |       |              |              |
|              | Ni                                   | 2173   |        | 2150   | µg/L  |              | 1% 20        |
| B173038-MS6  | Matrix Spike, (1745005-03)           |        |        |        |       |              |              |
|              | Ni                                   | 2173   | 252.5  | 2385   | µg/L  | NR 75-125    |              |
| B173038-MSD6 | Matrix Spike Duplicate, (1745005-03) |        |        |        |       |              |              |
|              | Ni                                   | 2173   | 252.5  | 2370   | µg/L  | NR 75-125    | N/C 20       |
| B173038-DUP4 | Duplicate, (1745005-18)              |        |        |        |       |              |              |
|              | Ni                                   | 0.3456 |        | 0.3098 | µg/L  |              | 11% 20       |
|              | Pb                                   | ND     |        | ND     | µg/L  |              | N/C 20       |
| B173038-MS4  | Matrix Spike, (1745005-18)           |        |        |        |       |              |              |
|              | Ni                                   | 0.3456 | 10.10  | 9.931  | µg/L  | 95% 75-125   |              |
|              | Pb                                   | ND     | 10.10  | 11.05  | µg/L  | 109% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173038  
**Lab Matrix:** Water  
**Method:** EPA 1640 Column

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B173038-MSD4 | Matrix Spike Duplicate, (1745005-18) |        |       |        |       |              |              |
|              | Ni                                   | 0.3456 | 10.10 | 9.994  | µg/L  | 96% 75-125   | 0.6% 20      |
|              | Pb                                   | ND     | 10.10 | 11.17  | µg/L  | 111% 75-125  | 1% 20        |



## Accuracy & Precision Summary

Batch: B173045  
 Lab Matrix: Water  
 Method: EPA 1631 E

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173045-SRM1 | Standard Reference Material (1745012, THg SRM NIST 1641d)<br>Hg |        | 15.68 | 15.35  | ng/L  | 98% 80-120   |              |
| B173045-MS2  | Matrix Spike (1745005-01)<br>Hg                                 | 106.7  | 24.49 | 130.2  | ng/L  | NR 71-125    |              |
| B173045-MSD2 | Matrix Spike Duplicate (1745005-01)<br>Hg                       | 106.7  | 24.49 | 123.0  | ng/L  | NR 71-125    | N/C 24       |
| B173045-MS3  | Matrix Spike (1745005-12)<br>Hg                                 | 4.85   | 20.41 | 25.91  | ng/L  | 103% 71-125  |              |
| B173045-MSD3 | Matrix Spike Duplicate (1745005-12)<br>Hg                       | 4.85   | 20.41 | 25.06  | ng/L  | 99% 71-125   | 3% 24        |
| B173045-MS4  | Matrix Spike (1745005-18)<br>Hg                                 | ND     | 4.040 | 3.93   | ng/L  | 97% 71-125   |              |
| B173045-MSD4 | Matrix Spike Duplicate (1745005-18)<br>Hg                       | ND     | 4.040 | 3.79   | ng/L  | 94% 71-125   | 4% 24        |





## Accuracy & Precision Summary

Batch: B173243  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample      | Analyte                | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|------------------------|--------|-------|--------|-------|--------------|--------------|
| B173243-BS1 | Blank Spike, (1738012) |        |       |        |       |              |              |
|             |                        | Al     |       | 400.0  | 361.6 | µg/L         | 90% 75-125   |
|             |                        | As     |       | 20.00  | 20.48 | µg/L         | 102% 75-125  |
|             |                        | Ca     |       | 400.0  | 378.3 | µg/L         | 95% 75-125   |
|             |                        | Cu     |       | 20.00  | 20.51 | µg/L         | 103% 75-125  |
|             |                        | Fe     |       | 400.0  | 399.1 | µg/L         | 100% 75-125  |
|             |                        | K      |       | 400.0  | 392.4 | µg/L         | 98% 75-125   |
|             |                        | Mg     |       | 400.0  | 370.3 | µg/L         | 93% 75-125   |
|             |                        | Mn     |       | 20.00  | 20.04 | µg/L         | 100% 75-125  |
|             |                        | Na     |       | 400.0  | 381.5 | µg/L         | 95% 75-125   |
| B173243-BS2 | Blank Spike, (1738012) |        |       |        |       |              |              |
|             |                        | Al     |       | 400.0  | 366.0 | µg/L         | 92% 75-125   |
|             |                        | As     |       | 20.00  | 20.33 | µg/L         | 102% 75-125  |
|             |                        | Ca     |       | 400.0  | 383.8 | µg/L         | 96% 75-125   |
|             |                        | Cu     |       | 20.00  | 20.82 | µg/L         | 104% 75-125  |
|             |                        | Fe     |       | 400.0  | 405.3 | µg/L         | 101% 75-125  |
|             |                        | K      |       | 400.0  | 399.2 | µg/L         | 100% 75-125  |
|             |                        | Mg     |       | 400.0  | 375.1 | µg/L         | 94% 75-125   |
|             |                        | Mn     |       | 20.00  | 20.19 | µg/L         | 101% 75-125  |
|             |                        | Na     |       | 400.0  | 388.5 | µg/L         | 97% 75-125   |
| B173243-BS3 | Blank Spike, (1738012) |        |       |        |       |              |              |
|             |                        | Al     |       | 400.0  | 366.4 | µg/L         | 92% 75-125   |
|             |                        | As     |       | 20.00  | 20.35 | µg/L         | 102% 75-125  |
|             |                        | Ca     |       | 400.0  | 380.0 | µg/L         | 95% 75-125   |
|             |                        | Cu     |       | 20.00  | 20.73 | µg/L         | 104% 75-125  |
|             |                        | Fe     |       | 400.0  | 399.4 | µg/L         | 100% 75-125  |
|             |                        | K      |       | 400.0  | 396.2 | µg/L         | 99% 75-125   |
|             |                        | Mg     |       | 400.0  | 370.3 | µg/L         | 93% 75-125   |
|             |                        | Mn     |       | 20.00  | 19.91 | µg/L         | 100% 75-125  |
|             |                        | Na     |       | 400.0  | 385.7 | µg/L         | 96% 75-125   |



## Accuracy & Precision Summary

Batch: B173243  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte  | Native | Spike | Result | Units       | REC & Limits | RPD & Limits |
|---------------------|--|--------|-------|--------|-------------|--------------|--------------|
| <b>B173243-SRM1</b> | <b>Standard Reference Material (1724009, T221 as SRM)</b>            |        |       |        |             |              |              |
|                     | Al   |        | 374.0 | 352.1  | µg/L        | 94% 75-125   |              |
|                     | As   |        | 17.70 | 18.03  | µg/L        | 102% 75-125  |              |
|                     | Ca   |        | 16700 | 16120  | µg/L        | 97% 75-125   |              |
|                     | Cu   |        | 3.780 | 4.020  | µg/L        | 106% 75-125  |              |
|                     | Fe   |        | 328.0 | 327.2  | µg/L        | 100% 75-125  |              |
|                     | K  |        | 1900  | 1885   | µg/L        | 99% 75-125   |              |
|                     | Mg   |        | 3770  | 3525   | µg/L        | 93% 75-125   |              |
|                     | Mn   |        | 33.60 | 33.65  | µg/L        | 100% 75-125  |              |
|                     | Na   |        | 17400 | 16820  | µg/L        | 97% 75-125   |              |
| Si                  |  | 5843   | 6506  | µg/L   | 111% 75-125 |              |              |
| <b>B173243-SRM2</b> | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |        |       |        |             |              |              |
|                     | Al   |        | 53.00 | 49.32  | µg/L        | 93% 75-125   |              |
|                     | As   |        | 8.075 | 7.838  | µg/L        | 97% 75-125   |              |
|                     | Ca   |        | 5615  | 5181   | µg/L        | 92% N/A      |              |
|                     | Cu   |        | 85.75 | 86.16  | µg/L        | 100% 75-125  |              |
|                     | Fe   |        | 36.80 | 37.05  | µg/L        | 101% 75-125  |              |
|                     | K  |        | 579.9 | 570.0  | µg/L        | 98% 0-200    |              |
|                     | Mg   |        | 1059  | 954.4  | µg/L        | 90% N/A      |              |
|                     | Mn   |        | 40.39 | 39.23  | µg/L        | 97% 75-125   |              |
|                     | Na   |        | 3137  | 2956   | µg/L        | 94% N/A      |              |
| Si                  |  | 5210   | 5538  | µg/L   | 106% N/A    |              |              |
| <b>B173243-DUP6</b> | <b>Duplicate, (1745005-01)</b>                                       |        |       |        |             |              |              |
|                     | Al   | 2946   |       | 2913   | µg/L        |              | 1% 20        |
|                     | As   | 767.2  |       | 782.0  | µg/L        |              | 2% 20        |
|                     | Ca   | 4800   |       | 5377   | µg/L        |              | 11% 20       |
|                     | Cu   | 66.93  |       | 66.82  | µg/L        |              | 0.2% 20      |
|                     | Fe   | 3237   |       | 3279   | µg/L        |              | 1% 20        |
|                     | K  | 5667   |       | 5682   | µg/L        |              | 0.3% 20      |
|                     | Mg   | 2679   |       | 2722   | µg/L        |              | 2% 20        |
|                     | Mn   | 31.10  |       | 31.13  | µg/L        |              | 0.08% 20     |
|                     | Na   | 269100 |       | 271300 | µg/L        |              | 0.8% 20      |
| Si                  | 71760  |        | 71440 | µg/L   |             | 0.5% 20      |              |



## Accuracy & Precision Summary

Batch: B173243  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike  | Result | Units      | REC & Limits | RPD & Limits |
|---------------------|---|--------|--------|--------|------------|--------------|--------------|
| <b>B173243-MS6</b>  | <b>Matrix Spike, (1745005-01)</b>           |        |        |        |            |              |              |
|                     | Al  | 2946   | 4082   | 6652   | µg/L       | 91% 75-125   |              |
|                     | As  | 767.2  | 408.2  | 1163   | µg/L       | 97% 75-125   |              |
|                     | Ca  | 4800   | 4082   | 8862   | µg/L       | 100% 75-125  |              |
|                     | Cu  | 66.93  | 408.2  | 505.8  | µg/L       | 108% 75-125  |              |
|                     | Fe  | 3237   | 4082   | 6335   | µg/L       | 76% 75-125   |              |
|                     | K   | 5667   | 4082   | 9674   | µg/L       | 98% 75-125   |              |
|                     | Mg  | 2679   | 4082   | 6402   | µg/L       | 91% 75-125   |              |
|                     | Mn  | 31.10  | 408.2  | 428.6  | µg/L       | 97% 75-125   |              |
|                     | Na  | 269100 | 4082   | 272400 | µg/L       | NR 75-125    |              |
| Si                  | 71760                                       | 40820  | 110700 | µg/L   | 95% 75-125 |              |              |
| <b>B173243-MSD6</b> | <b>Matrix Spike Duplicate, (1745005-01)</b> |        |        |        |            |              |              |
|                     | Al  | 2946   | 4082   | 6555   | µg/L       | 88% 75-125   | 1% 20        |
|                     | As  | 767.2  | 408.2  | 1151   | µg/L       | 94% 75-125   | 1% 20        |
|                     | Ca  | 4800   | 4082   | 8467   | µg/L       | 90% 75-125   | 5% 20        |
|                     | Cu  | 66.93  | 408.2  | 502.6  | µg/L       | 107% 75-125  | 0.6% 20      |
|                     | Fe  | 3237   | 4082   | 6994   | µg/L       | 92% 75-125   | 10% 20       |
|                     | K   | 5667   | 4082   | 9654   | µg/L       | 98% 75-125   | 0.2% 20      |
|                     | Mg  | 2679   | 4082   | 6366   | µg/L       | 90% 75-125   | 0.6% 20      |
|                     | Mn  | 31.10  | 408.2  | 425.8  | µg/L       | 97% 75-125   | 0.7% 20      |
|                     | Na  | 269100 | 4082   | 270600 | µg/L       | NR 75-125    | N/C 20       |
| Si                  | 71760                                       | 40820  | 112100 | µg/L   | 99% 75-125 | 1% 20        |              |
| <b>B173243-DUP7</b> | <b>Duplicate, (1745005-12)</b>              |        |        |        |            |              |              |
|                     | Al  | 601.7  |        | 600.3  | µg/L       |              | 0.2% 20      |
|                     | As  | 9.559  |        | 9.099  | µg/L       |              | 5% 20        |
|                     | Ca  | 101900 |        | 100900 | µg/L       |              | 1% 20        |
|                     | Cu  | 1.203  |        | 1.275  | µg/L       |              | 6% 20        |
|                     | Fe  | 1999   |        | 2001   | µg/L       |              | 0.1% 20      |
|                     | K   | 31860  |        | 31320  | µg/L       |              | 2% 20        |
|                     | Mg  | 148800 |        | 148300 | µg/L       |              | 0.4% 20      |
|                     | Mn  | 212.6  |        | 211.9  | µg/L       |              | 0.3% 20      |
| Na                  | 262900                                      |        | 260800 | µg/L   |            | 0.8% 20      |              |
| Si                  | 25130                                       |        | 23820  | µg/L   |            | 5% 20        |              |



## Accuracy & Precision Summary

Batch: B173243  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B173243-MS7</b>  | <b>Matrix Spike, (1745005-12)</b>           |        |       |        |       |              |              |
|                     | Al  | 601.7  | 4082  | 4332   | µg/L  | 91% 75-125   |              |
|                     | As  | 9.559  | 408.2 | 411.3  | µg/L  | 98% 75-125   |              |
|                     | Ca  | 101900 | 4082  | 104100 | µg/L  | NR 75-125    |              |
|                     | Cu  | 1.203  | 408.2 | 437.8  | µg/L  | 107% 75-125  |              |
|                     | Fe  | 1999   | 4082  | 5805   | µg/L  | 93% 75-125   |              |
|                     | K   | 31860  | 4082  | 35570  | µg/L  | NR 75-125    |              |
|                     | Mg  | 148800 | 4082  | 152000 | µg/L  | NR 75-125    |              |
|                     | Mn  | 212.6  | 408.2 | 610.5  | µg/L  | 97% 75-125   |              |
|                     | Na  | 262900 | 4082  | 266400 | µg/L  | NR 75-125    |              |
|                     | Si  | 25130  | 40820 | 65660  | µg/L  | 99% 75-125   |              |
| <b>B173243-MSD7</b> | <b>Matrix Spike Duplicate, (1745005-12)</b> |        |       |        |       |              |              |
|                     | Al  | 601.7  | 4082  | 4358   | µg/L  | 92% 75-125   | 0.6% 20      |
|                     | As  | 9.559  | 408.2 | 446.9  | µg/L  | 107% 75-125  | 8% 20        |
|                     | Ca  | 101900 | 4082  | 103900 | µg/L  | NR 75-125    | N/C 20       |
|                     | Cu  | 1.203  | 408.2 | 440.8  | µg/L  | 108% 75-125  | 0.7% 20      |
|                     | Fe  | 1999   | 4082  | 5804   | µg/L  | 93% 75-125   | 0.02% 20     |
|                     | K   | 31860  | 4082  | 35180  | µg/L  | NR 75-125    | N/C 20       |
|                     | Mg  | 148800 | 4082  | 150800 | µg/L  | NR 75-125    | N/C 20       |
|                     | Mn  | 212.6  | 408.2 | 611.7  | µg/L  | 98% 75-125   | 0.2% 20      |
|                     | Na  | 262900 | 4082  | 267100 | µg/L  | NR 75-125    | N/C 20       |
|                     | Si  | 25130  | 40820 | 66810  | µg/L  | 102% 75-125  | 2% 20        |
| <b>B173243-DUPA</b> | <b>Duplicate, (1745005-16)</b>              |        |       |        |       |              |              |
|                     | As  | 2.673  |       | 2.302  | µg/L  |              | 15% 20       |
| <b>B173243-MSA</b>  | <b>Matrix Spike, (1745005-16)</b>           |        |       |        |       |              |              |
|                     | As  | 2.673  | 1020  | 905.8  | µg/L  | 89% 75-125   |              |
| <b>B173243-MSDA</b> | <b>Matrix Spike Duplicate, (1745005-16)</b> |        |       |        |       |              |              |
|                     | As  | 2.673  | 1020  | 1002   | µg/L  | 98% 75-125   | 10% 20       |
| <b>B173243-DUP3</b> | <b>Duplicate, (1745005-17)</b>              |        |       |        |       |              |              |
|                     | Na  | 736500 |       | 727300 | µg/L  |              | 1% 20        |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173243  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample       | Analyte                                    | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|--------|--------|-------|--------------|--------------|
| B173243-MS3  | Matrix Spike, (1745005-17)<br>Na           | 736500 | 102000 | 828300 | µg/L  | NR 75-125    |              |
| B173243-MSD3 | Matrix Spike Duplicate, (1745005-17)<br>Na | 736500 | 102000 | 839700 | µg/L  | NR 75-125    | N/C 20       |



## Method Blanks & Reporting Limits

**Batch:** B173027  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** DMA<sub>s</sub>

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173027-BLK1    | 0.00         | µg/L  |                   |
| B173027-BLK2    | 0.00         | µg/L  |                   |
| B173027-BLK3    | 0.00         | µg/L  |                   |
| B173027-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B173027-BLK1    | 0.00          | µg/L         |                   |
| B173027-BLK2    | 0.00          | µg/L         |                   |
| B173027-BLK3    | 0.00          | µg/L         |                   |
| B173027-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL:</b> 0.023 |



## Method Blanks & Reporting Limits

**Batch:** B173038  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Ni

| Sample       | Result | Units |
|--------------|--------|-------|
| B173038-BLK1 | 0.0144 | µg/L  |
| B173038-BLK2 | 0.0155 | µg/L  |
| B173038-BLK3 | 0.0121 | µg/L  |
| B173038-BLK4 | 0.0162 | µg/L  |

**Average:** 0.0146  
**Limit:** 0.0300

**MDL:** 0.0070  
**MRL:** 0.0300

**Analyte:** Pb

| Sample       | Result  | Units |
|--------------|---------|-------|
| B173038-BLK1 | -0.0002 | µg/L  |
| B173038-BLK2 | -0.0003 | µg/L  |
| B173038-BLK3 | -0.0002 | µg/L  |
| B173038-BLK4 | -0.0002 | µg/L  |

**Average:** -0.0002  
**Limit:** 0.0150

**MDL:** 0.0050  
**MRL:** 0.0150



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B173045  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample       | Result               | Units |                                 |                  |
|--------------|----------------------|-------|---------------------------------|------------------|
| B173045-BLK1 | 0.13                 | ng/L  |                                 |                  |
| B173045-BLK2 | 0.09                 | ng/L  |                                 |                  |
| B173045-BLK3 | 0.08                 | ng/L  |                                 |                  |
| B173045-BLK4 | 0.12                 | ng/L  |                                 |                  |
|              | <b>Average:</b> 0.11 |       | <b>Standard Deviation:</b> 0.02 | <b>MDL:</b> 0.10 |
|              | <b>Limit:</b> 0.50   |       | <b>Limit:</b> 0.10              | <b>MRL:</b> 0.40 |



## Method Blanks & Reporting Limits

**Batch:** B173243  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Al

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173243-BLK1    | 0.031  | µg/L  |                   |
| B173243-BLK2    | -0.025 | µg/L  |                   |
| B173243-BLK3    | 0.006  | µg/L  |                   |
| B173243-BLK4    | -0.014 | µg/L  |                   |
| <b>Average:</b> | 0.000  |       | <b>MDL:</b> 0.500 |
| <b>Limit:</b>   | 2.000  |       | <b>MRL:</b> 2.00  |

**Analyte:** As

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173243-BLK1    | -0.027 | µg/L  |                   |
| B173243-BLK2    | -0.024 | µg/L  |                   |
| B173243-BLK3    | -0.032 | µg/L  |                   |
| B173243-BLK4    | -0.024 | µg/L  |                   |
| <b>Average:</b> | -0.027 |       | <b>MDL:</b> 0.011 |
| <b>Limit:</b>   | 0.040  |       | <b>MRL:</b> 0.040 |

**Analyte:** Ca

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B173243-BLK1    | -0.052 | µg/L  |                  |
| B173243-BLK2    | -0.194 | µg/L  |                  |
| B173243-BLK3    | -0.136 | µg/L  |                  |
| B173243-BLK4    | -0.071 | µg/L  |                  |
| <b>Average:</b> | -0.113 |       | <b>MDL:</b> 4.60 |
| <b>Limit:</b>   | 13.800 |       | <b>MRL:</b> 13.8 |



## Method Blanks & Reporting Limits

### Analyte: Cu

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173243-BLK1    | 0.008        | µg/L  |                   |
| B173243-BLK2    | 0.006        | µg/L  |                   |
| B173243-BLK3    | 0.002        | µg/L  |                   |
| B173243-BLK4    | 0.005        | µg/L  |                   |
| <b>Average:</b> | <b>0.005</b> |       | <b>MDL: 0.022</b> |
| <b>Limit:</b>   | <b>0.066</b> |       | <b>MRL: 0.066</b> |

### Analyte: Fe

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173243-BLK1    | 0.06        | µg/L  |                  |
| B173243-BLK2    | -0.004      | µg/L  |                  |
| B173243-BLK3    | -0.007      | µg/L  |                  |
| B173243-BLK4    | 0.02        | µg/L  |                  |
| <b>Average:</b> | <b>0.02</b> |       | <b>MDL: 0.28</b> |
| <b>Limit:</b>   | <b>0.85</b> |       | <b>MRL: 0.85</b> |

### Analyte: K

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173243-BLK1    | -0.006      | µg/L  |                  |
| B173243-BLK2    | -0.1        | µg/L  |                  |
| B173243-BLK3    | -0.02       | µg/L  |                  |
| B173243-BLK4    | -0.05       | µg/L  |                  |
| <b>Average:</b> | <b>0.0</b>  |       | <b>MDL: 2.4</b>  |
| <b>Limit:</b>   | <b>10.0</b> |       | <b>MRL: 10.0</b> |

### Analyte: Mg

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B173243-BLK1    | -0.02        | µg/L  |                  |
| B173243-BLK2    | -0.002       | µg/L  |                  |
| B173243-BLK3    | -0.0002      | µg/L  |                  |
| B173243-BLK4    | -0.008       | µg/L  |                  |
| <b>Average:</b> | <b>-0.01</b> |       | <b>MDL: 0.54</b> |
| <b>Limit:</b>   | <b>1.70</b>  |       | <b>MRL: 1.70</b> |



## Method Blanks & Reporting Limits

### Analyte: Mn

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B173243-BLK1    | 0.00005       | µg/L  |                   |
| B173243-BLK2    | -0.0001       | µg/L  |                   |
| B173243-BLK3    | -0.002        | µg/L  |                   |
| B173243-BLK4    | -0.001        | µg/L  |                   |
| <b>Average:</b> | <b>-0.001</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.040</b>  |       | <b>MRL: 0.040</b> |

### Analyte: Na

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B173243-BLK1    | -1.41         | µg/L  |                  |
| B173243-BLK2    | -1.77         | µg/L  |                  |
| B173243-BLK3    | -1.03         | µg/L  |                  |
| B173243-BLK4    | -1.32         | µg/L  |                  |
| <b>Average:</b> | <b>-1.385</b> |       | <b>MDL: 2.30</b> |
| <b>Limit:</b>   | <b>4.600</b>  |       | <b>MRL: 4.60</b> |

### Analyte: Si

| Sample          | Result      | Units |                  |
|-----------------|-------------|-------|------------------|
| B173243-BLK1    | 0.57        | µg/L  |                  |
| B173243-BLK2    | 0.36        | µg/L  |                  |
| B173243-BLK3    | 0.47        | µg/L  |                  |
| B173243-BLK4    | 0.55        | µg/L  |                  |
| <b>Average:</b> | <b>0.49</b> |       | <b>MDL: 0.80</b> |
| <b>Limit:</b>   | <b>4.00</b> |       | <b>MRL: 4.00</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1745005-01         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |  |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-121+80-1-110317 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |  |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                 | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |  |
| B                                 | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |  |
| C                                 | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |  |

| <b>Lab ID:</b> 1745005-02              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |  |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-121+80-1-110317-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |  |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                      | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |  |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |  |
| C                                      | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |  |
| D                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |  |
| E                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |  |

| <b>Lab ID:</b> 1745005-03         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |  |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-122+60-1-110317 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |  |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                 | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |  |
| B                                 | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |  |
| C                                 | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1745005-04              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |  |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-122+60-1-110317-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |  |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                      | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |  |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |  |
| C                                      | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |  |
| D                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |  |
| E                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |  |

| <b>Lab ID:</b> 1745005-05         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |  |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> GW-122+60-3-110317 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |  |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                 | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |  |
| B                                 | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |  |
| C                                 | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1745005-06

**Sample:** GW-122+60-3-110317-(20)

**Report Matrix:** Water  
**Sample Type:** Sample

**Collected:** 11/03/2017  
**Received:** 11/06/2017

| <b>Des</b> | <b>Container</b>        | <b>Size</b> | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
|------------|-------------------------|-------------|------------|------------------------|--------------|-----------|--------------------|
| A          | Bottle FLPE Hg-T        | 250mL       | 17-0141    | none                   | n/a          |           | Cooler - 1745005   |
| B          | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2        | Cooler - 1745005   |
| C          | Bottle HDPE ICP-W       | 125mL       | 17-0213    | 0.2% HNO3 (BAL)        | 1740028      | <2        | Cooler - 1745005   |
| D          | Vacutainer              | 6mL         | 16-0257    | EDTA (PP)              | n/a          |           | Cooler - 1745005   |
| E          | EXTRA_VOL               | 6mL         | 16-0257    | EDTA (PP)              | n/a          |           | Cooler - 1745005   |

**Lab ID:** 1745005-07

**Sample:** GW-122+60-0-110317

**Report Matrix:** Water  
**Sample Type:** Sample

**Collected:** 11/03/2017  
**Received:** 11/06/2017

| <b>Des</b> | <b>Container</b>        | <b>Size</b> | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
|------------|-------------------------|-------------|------------|------------------------|--------------|-----------|--------------------|
| A          | Bottle FLPE Hg-T        | 250mL       | 17-0141    | none                   | n/a          |           | Cooler - 1745005   |
| B          | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2        | Cooler - 1745005   |
| C          | Bottle HDPE ICP-W       | 125mL       | 17-0213    | 0.2% HNO3 (BAL)        | 1740028      | <2        | Cooler - 1745005   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1745005-08              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-122+60-0-110317-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |
| C                                      | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |
| D                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |
| E                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |

| <b>Lab ID:</b> 1745005-09         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-124+00-3-110317 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                 | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |
| B                                 | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |
| C                                 | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1745005-10<br><b>Sample:</b> GW-124+00-3-110317-(20) |                         |             | <b>Report Matrix:</b> Water<br><b>Sample Type:</b> Sample |                        |              | <b>Collected:</b> 11/03/2017<br><b>Received:</b> 11/06/2017 |                    |
|---|-------------------------|-------------|---|------------------------|--------------|---|--------------------|
| <b>Des</b>  | <b>Container</b>        | <b>Size</b> | <b>Lot</b>  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>   | <b>Ship. Cont.</b> |
| A   | Bottle FLPE Hg-T        | 250mL       | 17-0141   | none                   | n/a          |   | Cooler - 1745005   |
| B   | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176   | 0.1% Optima HNO3 (BAL) | 1649047      | <2  | Cooler - 1745005   |
| C   | Bottle HDPE ICP-W       | 125mL       | 17-0213   | 0.2% HNO3 (BAL)        | 1740028      | <2  | Cooler - 1745005   |
| D   | Vacutainer              | 6mL         | 16-0257   | EDTA (PP)              | n/a          |   | Cooler - 1745005   |
| E   | EXTRA_VOL               | 6mL         | 16-0257   | EDTA (PP)              | n/a          |   | Cooler - 1745005   |

| <b>Lab ID:</b> 1745005-11<br><b>Sample:</b> GW-IC1-3-110317-(20) |                  |             | <b>Report Matrix:</b> Water<br><b>Sample Type:</b> Sample |                     |              | <b>Collected:</b> 11/03/2017<br><b>Received:</b> 11/06/2017 |                    |
|--|------------------|-------------|---|---------------------|--------------|---|--------------------|
| <b>Des</b>   | <b>Container</b> | <b>Size</b> | <b>Lot</b>  | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>   | <b>Ship. Cont.</b> |
| D  | Vacutainer       | 6mL         | 16-0257   | EDTA (PP)           | n/a          |   | Cooler - 1745005   |
| E  | EXTRA_VOL        | 6mL         | 16-0257   | EDTA (PP)           | n/a          |   | Cooler - 1745005   |

| <b>Lab ID:</b> 1745005-12<br><b>Sample:</b> GW-125+50-3-110317 |                         |             | <b>Report Matrix:</b> Water<br><b>Sample Type:</b> Sample |                        |              | <b>Collected:</b> 11/03/2017<br><b>Received:</b> 11/06/2017 |                    |
|--|-------------------------|-------------|---|------------------------|--------------|---|--------------------|
| <b>Des</b>   | <b>Container</b>        | <b>Size</b> | <b>Lot</b>  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>   | <b>Ship. Cont.</b> |
| A  | Bottle FLPE Hg-T        | 250mL       | 17-0141   | none                   | n/a          |   | Cooler - 1745005   |
| B  | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176   | 0.1% Optima HNO3 (BAL) | 1649047      | <2  | Cooler - 1745005   |
| C  | Bottle HDPE ICP-W       | 125mL       | 17-0213   | 0.2% HNO3 (BAL)        | 1740028      | <2  | Cooler - 1745005   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1745005-13              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-125+50-3-110317-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |
| C                                      | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |
| D                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |
| E                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |

| <b>Lab ID:</b> 1745005-14         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-128+30-3-110317 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                 | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |
| B                                 | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |
| C                                 | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1745005-15

**Sample:** GW-128+30-3-110317-(20)

**Report Matrix:** Water  
**Sample Type:** Sample

**Collected:** 11/03/2017  
**Received:** 11/06/2017

| <b>Des</b> | <b>Container</b>        | <b>Size</b> | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
|------------|-------------------------|-------------|------------|------------------------|--------------|-----------|--------------------|
| A          | Bottle FLPE Hg-T        | 250mL       | 17-0141    | none                   | n/a          |           | Cooler - 1745005   |
| B          | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2        | Cooler - 1745005   |
| C          | Bottle HDPE ICP-W       | 125mL       | 17-0213    | 0.2% HNO3 (BAL)        | 1740028      | <2        | Cooler - 1745005   |
| D          | Vacutainer              | 6mL         | 16-0257    | EDTA (PP)              | n/a          |           | Cooler - 1745005   |
| E          | EXTRA_VOL               | 6mL         | 16-0257    | EDTA (PP)              | n/a          |           | Cooler - 1745005   |

**Lab ID:** 1745005-16

**Sample:** GW-129+65-3-110317

**Report Matrix:** Water  
**Sample Type:** Sample

**Collected:** 11/03/2017  
**Received:** 11/06/2017

| <b>Des</b> | <b>Container</b>        | <b>Size</b> | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
|------------|-------------------------|-------------|------------|------------------------|--------------|-----------|--------------------|
| A          | Bottle FLPE Hg-T        | 250mL       | 17-0141    | none                   | n/a          |           | Cooler - 1745005   |
| B          | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2        | Cooler - 1745005   |
| C          | Bottle HDPE ICP-W       | 125mL       | 17-0213    | 0.2% HNO3 (BAL)        | 1740028      | <2        | Cooler - 1745005   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1745005-17              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-129+65-3-110317-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |
| C                                      | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |
| D                                      | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |
| E                                      | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |

| <b>Lab ID:</b> 1745005-18         |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/03/2017 |                    |
|-----------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-131-00-3-110317 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/06/2017  |                    |
| <b>Des</b>                        | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                 | Bottle FLPE Hg-T        | 250mL       | 17-0141                     | none                   | n/a          |                              | Cooler - 1745005   |
| B                                 | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |
| C                                 | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1745005  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1745005-19              |                         | <b>Report Matrix:</b> Water |            |                        |              | <b>Collected:</b> 11/03/2017 |                    |
|--|-------------------------|-----------------------------|------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-131-00-3-110317-(20) |                         | <b>Sample Type:</b> Sample  |            |                        |              | <b>Received:</b> 11/06/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Bottle FLPE Hg-T        | 250mL                       | 17-0141    | none                   | n/a          |                              | Cooler - 1745005   |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL                        | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1745005   |
| C                                      | Bottle HDPE ICP-W       | 125mL                       | 17-0213    | 0.2% HNO3 (BAL)        | 1740028      | <2                           | Cooler - 1745005   |
| D                                      | Vacutainer              | 6mL                         | 16-0257    | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |
| E                                      | EXTRA_VOL               | 6mL                         | 16-0257    | EDTA (PP)              | n/a          |                              | Cooler - 1745005   |

| <b>Lab ID:</b> 1745005-20 |                  | <b>Report Matrix:</b> Water      |            |                     |              | <b>Collected:</b> 11/03/2017 |                    |
|---------------------------|------------------|----------------------------------|------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> EB-110317  |                  | <b>Sample Type:</b> Equip. Blank |            |                     |              | <b>Received:</b> 11/06/2017  |                    |
| <b>Des</b>                | <b>Container</b> | <b>Size</b>                      | <b>Lot</b> | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| D                         | Vacutainer       | 6mL                              | 16-0257    | EDTA (PP)           | n/a          |                              | Cooler - 1745005   |
| E                         | EXTRA_VOL        | 6mL                              | 16-0257    | EDTA (PP)           | n/a          |                              | Cooler - 1745005   |

## Shipping Containers

### Cooler - 1745005

**Received:** November 6, 2017 13:35  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 5.1 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

BAL Report 1745005

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF)  
Contact: Troy Bussey (PIONEER)  
Client Project ID: Arkema FS DG Inv

PO Number: 79224  
Phone: 360-570-1700  
Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Madelin Allen For BAL use only Date: 11/6/17

Work Order ID: \_\_\_\_\_ Time: 13:35

Project ID: \_\_\_\_\_

Mail Invoice to:  
Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to:  
Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection                              |             | Client Sample Info |                      |                 |                   | BRL Analyses Required  |  |   |   |   |   |  | Comments |
|--|---|-------------|--------------------|----------------------|-----------------|-------------------|--|--|---|---|---|---|--|----------|
|  | Date                                    | Time        | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by EDD for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |             |                    |                      |                 |                   |  |  |   |   |   |   |  |          |
| Sample ID  |   |             |                    |                      |                 |                   |  |  |   |   |   |   |  |          |
| 1  | GW-121+80-1-110317                      | 11-3-17 910 | Water              | 3                    | Y               |                   |  |  |   | X   |   |   |  | 1 MS     |
| 2  | GW-121+80-1-110317-(20)                 | 910         |                    | 5                    | Y               |                   |  |  |   |   | X   | X   | X  | 1 MS     |
| 3  | GW-122+60-1-110317                      | 905         |                    | 3                    | Y               |                   |  |  |   |   |   |   |  | 29 MS    |
| 4  | GW-122+60-1-110317-(20)                 | 905         |                    | 5                    | Y               |                   |  |  |   | X   |   |   |  | 29 MS    |
| 5  | GW-122+60-3-110317                      | 1000        |                    | 3                    | Y               |                   |  |  |   | X   | X   | X   | X  | 29 MS    |
| 6  | GW-122+60-3-110317-(20)                 | 1000        |                    | 5                    | Y               |                   |  |  |   | X   |   |   |  | 5 MS     |
| 7  | GW-122+60-0-110317                      | 950         |                    | 3                    | Y               |                   |  |  |   | X   | X   | X   | X  | 5 MS     |
| 8  | GW-122+60-0-110317-(20)                 | 950         |                    | 5                    | Y               |                   |  |  |   | X   |   |   |  | 36 MS    |
| 9  | GW-124+00-3-110317                      | 1100        |                    | 3                    | Y               |                   |  |  |   | X   | X   | X   | X  | 36 MS    |
| 10   | GW-124+00-3-110317-(20)                 | 1100        |                    | 5                    | Y               |                   |  |  |   | X   |   |   |  | 2 MS     |
|  | Trip Blank (specify)                    |             |                    |                      |                 |                   |  |  |   |   | X   | X   | X  | 2 MS     |

Relinquished By: [Signature] Date: 11-6-17 Time: 1330 Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

Received By: [Signature] Date: 11/6/17 Time: 13:33 Total Number of Packages: \_\_\_\_\_

Page 1 of 2 List Hazardous Contaminants: \_\_\_\_\_

samples@brooksupplied.com | brooksupplied.com

Print





# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF)  
Contact: Troy Bussey (PIONEER)  
Client Project ID: Arkema FS DG Inv

PO Number: 79224  
Phone: 360-570-1700  
Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Maddeline Miller For BAL use only Date: 11/6/17

Work Order ID: \_\_\_\_\_ Time: 13:35

Project ID: \_\_\_\_\_

Mail Invoice to:  
Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to:  
Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)                  | Collection                              |                      | Client Sample Info      |                           |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |  |              |
|---|---|----------------------|-------------------------|---------------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|--|--------------|
|   | Date                                    | Time                 | Matrix Type             | Number of Containers      | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-6 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |  |              |
| <input checked="" type="checkbox"/> 20 (standard) | *Surcharges may apply to expedited TATs |                      |                         |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |  |              |
| <input type="checkbox"/> 15*                      | Sample ID                               |                      |                         |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |  |              |
| <input type="checkbox"/> 10*                      | 1                                       |                      | GW-161-3                | 11-3-17                   |                 | water             | 2  | Y   | 2   |   |   |   |  |          |                                      |  | Specify Here |
| <input type="checkbox"/> 5*                       | 2                                       | 1240                 | GW-125+50-3-110317      |                           |                 |                   | 3  | Y   |   |   |   |   |  |          |                                      |  | 3MS          |
| <input type="checkbox"/> Other _____              | 3                                       | 1240                 | GW-125+50-3-110317-(20) |                           |                 |                   | 5  | Y   |   | X   |   |   |  |          |                                      |  | 3MS          |
|   | 4                                       | 1245                 | GW-128+30-3-110317      |                           |                 |                   | 3  | Y   |   |   | X   | X   | X  |          |                                      |  | 3MS          |
|   | 5                                       | 1245                 | GW-128+30-3-110317-(20) |                           |                 |                   | 5  | Y   |   | X   |   |   |  |          |                                      |  | 2MS          |
|   | 6                                       | 1340                 | GW-129+65-3-110317      |                           |                 |                   | 3  | Y   |   |   | X   | X   | X  |          |                                      |  | 2MS          |
|   | 7                                       | 1340                 | GW-129+65-3-110317-(20) |                           |                 |                   | 5  | Y   |   | X   |   |   |  |          |                                      |  | 6MS          |
|   | 8                                       | 1400                 | GW-131-00-3-110317      |                           |                 |                   | 3  | Y   |   |   | X   | X   | X  |          |                                      |  | 6MS          |
|   | 9                                       | 1400                 | GW-131-00-3-110317-(20) |                           |                 |                   | 5  | Y   |   | X   |   |   |  |          |                                      |  | 3MS          |
|   | 10                                      | 1430                 | EB-110317               |                           |                 |                   | 2  | Y   |   |   | X   | X   | X  |          |                                      |  | 3MS          |
|   | Trip Blank (specify)                    |                      |                         |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |  |              |
| Relinquished By: <u>[Signature]</u>               |   | Date: <u>11-6-17</u> | Time: <u>1335</u>       | Relinquished By:          |                 | Date:             | Time:  |   |   |   |   |   |  |          |                                      |  |              |
| Received By: <u>[Signature]</u>                   |   | Date: <u>11/6/17</u> | Time: <u>13:33</u>      | Total Number of Packages: |                 |                   |  |   |   |   |   |   |  |          |                                      |  |              |

List Hazardous Contaminants: \_\_\_\_\_

## Jeremy Maute

---

**From:** Troy Bussey <busseyt@uspioneer.com>  
**Sent:** Wednesday, November 08, 2017 11:23 AM  
**To:** Collette Machado  
**Cc:** Jeremy Maute; dcooper@dofnw.com  
**Subject:** RE: Samples Received by Brooks Applied Labs

Collette –

On 1745005, can you please change the Sample ID for “GW-IC1-3” to “GW-IC1-3-110317-(20)”. Thank you.

Respectfully,  
 Troy

---

Troy Bussey Jr., P.E. (WA, CA, NC, SC), L.G. (WA, CA, NC, SC), L.H.G. (WA) :: [busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)  
 Principal Engineer

**PIONEER Technologies Corporation**  
 5205 Corporate Ctr. Ct. SE, Ste. A  
 Olympia, WA 98503-5901  
 Phone: 360.570.1700  
 Fax: 360.570.1777  
<http://www.uspioneer.com>

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**From:** Collette Machado [mailto:Collette@brooksapplied.com]  
**Sent:** Tuesday, November 07, 2017 11:39 AM  
**To:** Troy Bussey  
**Cc:** Jeremy Maute; dcooper@dofnw.com  
**Subject:** Samples Received by Brooks Applied Labs

Hi Troy,

On November 6, 2017, twenty water samples were received by our laboratory and logged in for total and dissolved mercury, arsenic, copper, lead, and nickel (Hg, As, Cu, Pb, Ni) analyses, in addition to dissolved trace metals (Fe, Al, Ca, Mg, Mn, K, Si, Na) analyses and arsenic (As) speciation analyses. The work order is 1745005. I have included in this email an electronic copy of the accompanying chain-of-custody forms.

The samples were received in a cooler with a temperature of 5.1°C and logged in for a 20 day TAT (samples due on 12/05/2017).

Please do not hesitate to contact myself or your project manager, Jeremy, with any questions or comments you may have.

Thank you,



Collette Machado  
Project Coordinator  
206-632-6206, ext. 124  
[collette@brooksapplied.com](mailto:collette@brooksapplied.com)

## BROOKS APPLIED LABS

### *Meaningful Metals Data and Advanced Speciation Solutions*

P: 206-632-6206 | F: 206-632-6017 | 18804 North Creek Parkway, Suite 100, Bothell, WA 98011, USA

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18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

January 12, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On November 16, 2017, Brooks Applied Labs (BAL) received twenty-four (24) water samples in a sealed container with a temperature of 3.1°C. The samples were logged-in for the total recoverable and dissolved metals (aluminum [Al], arsenic [As], calcium [Ca], iron [Fe], potassium [K], magnesium [Mg], manganese [Mg], sodium [Na], and silicon [Si]) analyses via digestion and subsequent analysis by modified EPA Method 1638. The silicon results are operationally defined as nitric acid-soluble [Si]. The samples were logged in for total recoverable and dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. In cases where an analytical bias is observed for (copper [Cu], lead [Pb], or nickel [Ni]) analyses by modified EPA Method 1640, the copper, lead, and/or nickel results are quantified and reported via modified EPA Method 1638. The samples were logged-in for the total mercury [Hg] analysis by EPA Method 1631E. The samples were logged-in for dissolved arsenic speciation analyses, including arsenite [As(III)], arsenate [As(V)], monomethylarsonic acid [MMAs], and dimethylarsinic acid [DMAs], according to the chain-of-custody (COC) forms.

The samples submitted for arsenic speciation and dissolved analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives was monitored for contamination to account for any biases associated with the sample results.

*Total Recoverable and Dissolved Metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, and Si) Analysis by EPA Method 1638, Mod.*

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Total recoverable and dissolved metals (Al, As, Ca, Cu, Fe, K, Mg, Mn, Na, and Si) quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

In some cases, higher dilutions were necessary to mitigate matrix interference on the analytical platform. In these instances, the MDLs and MRLs were elevated, and there are some cases where the target MDL/MRLs were not met as a result.

#### **Batch B173175**

The total recoverable and dissolved copper results for the **EB-111517/EB-111517-(20)** samples (1746027-01 and 1746027-02) were greater than the associated MRLs. Method blanks and bracketing CCBs were clean for copper and re-analyses confirmed the results. Copper results were reported from this batch.

The dissolved manganese result for the **EB-111517-(20)** sample (1746027-02) was greater than the associated MRL. Method blanks and bracketing CCBs were clean for manganese and re-analysis confirmed the result. Manganese results were reported from this batch.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. BAL requires that the MRL is at least 2 times the value of the corresponding MDL. Due to an elevated MDL, it was necessary to raise the Na MRL to 2 times the value of the MDL. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**NC**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### **Batch B173378**

The total recoverable arsenic result for the **EB-111517** sample (1746027-01) was greater than the associated MRL. Method blanks and bracketing CCBs were clean for arsenic and re-analysis confirmed the result. Arsenic results were reported from this batch.

The dissolved calcium, potassium, magnesium, sodium, and silicon results for the **EB-111517-(20)** sample (1746027-02) were greater than the associated MRLs. Method blanks and bracketing CCBs were clean for these analytes and re-analysis confirmed the results. Calcium, potassium, magnesium, sodium, and silicon results were reported from this batch.

The blank spike recovery for aluminum in B173378-BS1 was less than the laboratory control limit of 75%, at 74%. The work plan for this project lists a lower control limit of 70% for aluminum. Since this recovery is within the limits defined by the project work plan, no corrective action was necessary, and no data were qualified.

The blank spike recoveries for aluminum and potassium in B173378-BS2 were less than the laboratory control limit of 75%, at 73% and 74%, respectively. The work plan for this project lists a lower control limit of 70% for aluminum and potassium. Since the recoveries were within the limits defined by the project work plan, no corrective action was necessary, and no data were qualified.

The blank spike recovery for aluminum in B173378-BS3 was less than the laboratory control limit of 75%, at 73%. The work plan for this project lists a lower control limit of 70% for aluminum. Since this recovery is within the limits defined by the project work plan, no corrective action was necessary, and no data were qualified.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. BAL requires that the MRL is at least 2 times the value of the corresponding MDL. Due to an elevated MDL, it was necessary to raise the Si MRL to 2 times the value of the MDL. The Fe recovery for the low calibration standard used to set the MRL was less than the lower control limit of 70%. Thus, it was necessary to use the adjacent calibration standard to set the MRL for Fe, resulting in an elevated MRL. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Total Recoverable metals (Ni, and Pb) Analysis by EPA Method 1640, Mod.

A high bias due to the sample matrix was observed for Cu when compared to EPA Method 1638, Mod results. Consequently, Cu results are reported from EPA Method 1638, Mod analyses. Ni and Pb are reported via by EPA Method 1640, Mod.

Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid ( $\text{HNO}_3$ ) and then prepared according to EPA Method 1640. All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). The ICP-DRC-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

The lead reference materials were less than the MRL. Since the lead recoveries in the reference materials are not valid indicators of data quality, the lead recoveries for the reference materials were not reported.

#### **Batch B173176**

The total recoverable nickel and lead results for the **EB-111517** sample (1746027-01) were greater than the associated MRLs. Method blanks and bracketing CCBs were clean for nickel and lead and re-analyses confirmed the results. Nickel and lead results were reported from this batch.

The dissolved nickel and lead results for the **EB-111517-(20)** sample (1746027-02) were greater than the associated MRLs. Method blanks and bracketing CCBs were clean for these analytes and re-analysis confirmed the results. Nickel and lead results were reported from this batch.

Several cases were observed where the dissolved nickel and lead concentrations were greater than the corresponding total recoverable nickel and lead values. Re-analysis were completed, and in all cases, the results were confirmed. Results are reported as is, and are deemed representative of the supplied samples.

The lead result for sample 1746027-11 (19.1  $\mu\text{g/L}$ ) was significantly greater than the lead result generated via EPA Method 1638, Mod (2.96  $\mu\text{g/L}$ ). This is indicative of an analytical bias due to the matrix for sample 1746027-11. The lead result for sample 1746027-11 is reported via EPA Method 1640, Mod and the result is qualified as estimated "J-1" to indicate a potential positive bias.

The total recoverable and dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to

account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Total and Dissolved Mercury Quantitation by EPA Method 1631E

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

#### **Batch B173158**

Mercury results for the method blanks in batch B173158 were greater than the associated MRL. All associated client sample results less than 10x the method blank hits are qualified as estimated "J-1". These mercury results are potentially biased high. The source of the contamination was determined to be the BrCl used to preserve the client samples. The BrCl solution was removed from circulation. However, the client samples had already been preserved in the containers they were received in; there is no pathway in which the contamination could be mitigated.

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Arsenic Speciation Analysis by IC-ICP-CRC-MS

Arsenic speciation analysis was performed by ion chromatography coupled to an inductively coupled plasma collision reaction cell mass spectrometer (IC-ICP-CRC-MS).

#### **Batch B173167**

The sum of arsenic species was greater than the corresponding dissolved arsenic result for the client sample 1746027-22. Re-analyses confirmed both dissolved arsenic and arsenic speciation results. The container labels were checked and there was no indication of sample IDs getting switched. Since re-analyses confirmed, the arsenic speciation results for 1746027-22 are reported from Batch B173167 and results are deemed representative of the supplied samples.

With the exceptions noted above, all data was reported without qualification (aside from concentration qualifiers) and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksapplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                       | Lab ID     | Report Matrix | Type         | Sampled    | Received   |
|------------------------------|------------|---------------|--------------|------------|------------|
| EB-111517                    | 1746027-01 | Water         | Equip. Blank | 11/15/2017 | 11/16/2017 |
| EB-111517-(20)               | 1746027-02 | Water         | Equip. Blank | 11/15/2017 | 11/16/2017 |
| PW-120+75-ST1-DS-111517      | 1746027-03 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-120+75-ST1-DS-111517-(20) | 1746027-04 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-120+75-SW-111517          | 1746027-05 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-120+75-SW-111517-(20)     | 1746027-06 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-122+60-0-DS-111517        | 1746027-07 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-122+60-0-DS-111517-(20)   | 1746027-08 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-124+00-0-DS-111517        | 1746027-09 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-124+00-0-DS-111517-(20)   | 1746027-10 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-125+00-ST1-DS-111517      | 1746027-11 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-125+00-ST1-DS-111517-(20) | 1746027-12 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-125+00-SW-111517          | 1746027-13 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-125+00-SW-111517-(20)     | 1746027-14 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-125+50-0-DS-111517        | 1746027-15 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-125+50-0-DS-111517-(20)   | 1746027-16 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-126+90-0-DS-111517        | 1746027-17 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-126+90-0-DS-111517-(20)   | 1746027-18 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-128+30-0-DS-111517        | 1746027-19 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-128+30-0-DS-111517-(20)   | 1746027-20 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-128+50-ST1-DS-111517      | 1746027-21 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-128+50-ST1-DS-111517-(20) | 1746027-22 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-128+50-SW-111517          | 1746027-23 | Water         | Sample       | 11/15/2017 | 11/16/2017 |
| PW-128+50-SW-111517-(20)     | 1746027-24 | Water         | Sample       | 11/15/2017 | 11/16/2017 |





## Batch Summary

| Analyte | Lab Matrix | Method          | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|-----------------|------------|------------|---------|----------|
| Al      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/13/2017 | B173378 | 1701552  |
| As      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/13/2017 | B173378 | 1701552  |
| As      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/28/2017 | B173378 | 1701627  |
| As(III) | Water      | SOP BAL-4100    | 11/21/2017 | 11/21/2017 | B173167 | 1701450  |
| As(V)   | Water      | SOP BAL-4100    | 11/21/2017 | 11/21/2017 | B173167 | 1701450  |
| Ca      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/13/2017 | B173378 | 1701552  |
| Cu      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/09/2017 | B173175 | 1701537  |
| DMAs    | Water      | SOP BAL-4100    | 11/21/2017 | 11/21/2017 | B173167 | 1701450  |
| Fe      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/13/2017 | B173378 | 1701552  |
| Fe      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/28/2017 | B173378 | 1701627  |
| Hg      | Water      | EPA 1631 E      | 11/20/2017 | 11/21/2017 | B173158 | 1701452  |
| Hg      | Water      | EPA 1631 E      | 11/20/2017 | 11/24/2017 | B173158 | 1701464  |
| K       | Water      | EPA 1638 Mod    | 11/21/2017 | 12/13/2017 | B173378 | 1701552  |
| K       | Water      | EPA 1638 Mod    | 11/21/2017 | 12/28/2017 | B173378 | 1701627  |
| Mg      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/13/2017 | B173378 | 1701552  |
| MMAAs   | Water      | SOP BAL-4100    | 11/21/2017 | 11/21/2017 | B173167 | 1701450  |
| Mn      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/09/2017 | B173175 | 1701537  |
| Na      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/13/2017 | B173378 | 1701552  |
| Ni      | Water      | EPA 1640 Column | 11/22/2017 | 11/30/2017 | B173176 | 1701485  |
| Pb      | Water      | EPA 1640 Column | 11/22/2017 | 11/30/2017 | B173176 | 1701485  |
| Si      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/13/2017 | B173378 | 1701552  |
| Si      | Water      | EPA 1638 Mod    | 11/21/2017 | 12/28/2017 | B173378 | 1701627  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL    | MRL    | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|---------|-----------|--------|--------|------|---------|----------|
| <b>EB-111517</b>               |         |               |       |         |           |        |        |      |         |          |
| 1746027-01                     | As      | Water         | TR    | 0.043   |           | 0.011  | 0.041  | µg/L | B173378 | 1701552  |
| 1746027-01                     | Cu      | Water         | TR    | 0.865   |           | 0.022  | 0.067  | µg/L | B173175 | 1701537  |
| 1746027-01                     | Hg      | Water         | TR    | 0.61    | J-1       | 0.10   | 0.40   | ng/L | B173158 | 1701452  |
| 1746027-01                     | Ni      | Water         | TR    | 1.46    |           | 0.0071 | 0.0303 | µg/L | B173176 | 1701485  |
| 1746027-01                     | Pb      | Water         | TR    | 1.98    |           | 0.0051 | 0.0152 | µg/L | B173176 | 1701485  |
| <b>EB-111517-(20)</b>          |         |               |       |         |           |        |        |      |         |          |
| 1746027-02                     | Al      | Water         | D     | 0.665   | J         | 0.510  | 2.04   | µg/L | B173378 | 1701552  |
| 1746027-02                     | As      | Water         | D     | ≤ 0.011 | U         | 0.011  | 0.041  | µg/L | B173378 | 1701552  |
| 1746027-02                     | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200  | 1.00   | µg/L | B173167 | 1701450  |
| 1746027-02                     | As(V)   | Water         | D     | ≤ 0.200 | U         | 0.200  | 1.00   | µg/L | B173167 | 1701450  |
| 1746027-02                     | Ca      | Water         | D     | 21.5    |           | 4.69   | 14.1   | µg/L | B173378 | 1701552  |
| 1746027-02                     | Cu      | Water         | D     | 1.00    |           | 0.022  | 0.067  | µg/L | B173175 | 1701537  |
| 1746027-02                     | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250  | 1.05   | µg/L | B173167 | 1701450  |
| 1746027-02                     | Fe      | Water         | D     | 0.96    | J         | 0.41   | 4.08   | µg/L | B173378 | 1701552  |
| 1746027-02                     | Hg      | Water         | D     | 0.28    | J         | 0.10   | 0.40   | ng/L | B173158 | 1701452  |
| 1746027-02                     | K       | Water         | D     | 19.4    |           | 2.4    | 10.2   | µg/L | B173378 | 1701552  |
| 1746027-02                     | Mg      | Water         | D     | 7.24    |           | 0.55   | 1.73   | µg/L | B173378 | 1701552  |
| 1746027-02                     | MMA     | Water         | D     | ≤ 0.200 | U         | 0.200  | 1.15   | µg/L | B173167 | 1701450  |
| 1746027-02                     | Mn      | Water         | D     | 0.172   |           | 0.021  | 0.064  | µg/L | B173175 | 1701537  |
| 1746027-02                     | Na      | Water         | D     | 276     |           | 0.408  | 4.08   | µg/L | B173378 | 1701552  |
| 1746027-02                     | Ni      | Water         | D     | 3.37    |           | 0.0071 | 0.0303 | µg/L | B173176 | 1701485  |
| 1746027-02                     | Pb      | Water         | D     | 5.57    |           | 0.0051 | 0.0152 | µg/L | B173176 | 1701485  |
| 1746027-02                     | Si      | Water         | D     | 16.0    |           | 2.24   | 4.49   | µg/L | B173378 | 1701552  |
| <b>PW-120+75-ST1-DS-111517</b> |         |               |       |         |           |        |        |      |         |          |
| 1746027-03                     | As      | Water         | TR    | 7.81    |           | 0.449  | 1.63   | µg/L | B173378 | 1701552  |
| 1746027-03                     | Cu      | Water         | TR    | 7.81    |           | 0.898  | 2.69   | µg/L | B173175 | 1701537  |
| 1746027-03                     | Hg      | Water         | TR    | 10.8    |           | 0.10   | 0.40   | ng/L | B173158 | 1701452  |
| 1746027-03                     | Ni      | Water         | TR    | 3.38    |           | 0.141  | 0.606  | µg/L | B173176 | 1701485  |
| 1746027-03                     | Pb      | Water         | TR    | 7.49    |           | 0.101  | 0.303  | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                              | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-------------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-120+75-ST1-DS-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-04                          | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-04                          | As      | Water         | D     | 3.17    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-04                          | As(III) | Water         | D     | 1.41    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-04                          | As(V)   | Water         | D     | 2.25    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-04                          | Ca      | Water         | D     | 353000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-04                          | Cu      | Water         | D     | 3.71    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-04                          | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-04                          | Fe      | Water         | D     | ≤ 16.3  | U         | 16.3  | 163   | µg/L | B173378 | 1701552  |
| 1746027-04                          | Hg      | Water         | D     | 0.82    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-04                          | K       | Water         | D     | 318000  |           | 2450  | 10200 | µg/L | B173378 | 1701552  |
| 1746027-04                          | Mg      | Water         | D     | 1040000 |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-04                          | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-04                          | Mn      | Water         | D     | 7.54    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-04                          | Na      | Water         | D     | 8810000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-04                          | Ni      | Water         | D     | 0.640   |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-04                          | Pb      | Water         | D     | ≤ 0.101 | U         | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-04                          | Si      | Water         | D     | ≤ 2240  | U         | 2240  | 4490  | µg/L | B173378 | 1701552  |
| <b>PW-120+75-SW-111517</b>          |         |               |       |         |           |       |       |      |         |          |
| 1746027-05                          | As      | Water         | TR    | 4.36    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-05                          | Cu      | Water         | TR    | 5.37    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-05                          | Hg      | Water         | TR    | 10.3    |           | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-05                          | Ni      | Water         | TR    | 1.48    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-05                          | Pb      | Water         | TR    | 5.25    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                          | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|---------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-120+75-SW-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-06                      | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-06                      | As      | Water         | D     | 2.92    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-06                      | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-06                      | As(V)   | Water         | D     | 2.06    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-06                      | Ca      | Water         | D     | 356000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-06                      | Cu      | Water         | D     | 2.50    | J         | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-06                      | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-06                      | Fe      | Water         | D     | ≤ 16.3  | U         | 16.3  | 163   | µg/L | B173378 | 1701552  |
| 1746027-06                      | Hg      | Water         | D     | 0.62    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-06                      | K       | Water         | D     | 315000  |           | 2450  | 10200 | µg/L | B173378 | 1701552  |
| 1746027-06                      | Mg      | Water         | D     | 1050000 |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-06                      | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-06                      | Mn      | Water         | D     | 7.44    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-06                      | Na      | Water         | D     | 8980000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-06                      | Ni      | Water         | D     | 0.841   |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-06                      | Pb      | Water         | D     | 0.770   |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-06                      | Si      | Water         | D     | ≤ 2240  | U         | 2240  | 4490  | µg/L | B173378 | 1701552  |
| <b>PW-122+60-0-DS-111517</b>    |         |               |       |         |           |       |       |      |         |          |
| 1746027-07                      | As      | Water         | TR    | 13.7    |           | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-07                      | Cu      | Water         | TR    | 23.7    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-07                      | Hg      | Water         | TR    | 17.6    |           | 0.10  | 0.41  | ng/L | B173158 | 1701452  |
| 1746027-07                      | Ni      | Water         | TR    | 16.9    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-07                      | Pb      | Water         | TR    | 8.98    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                            | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-122+60-0-DS-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-08                        | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-08                        | As      | Water         | D     | 5.63    |           | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-08                        | As(III) | Water         | D     | 0.321   | J         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-08                        | As(V)   | Water         | D     | 2.43    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-08                        | Ca      | Water         | D     | 266000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-08                        | Cu      | Water         | D     | ≤ 0.898 | U         | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-08                        | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-08                        | Fe      | Water         | D     | 52.2    | J         | 40.8  | 408   | µg/L | B173378 | 1701627  |
| 1746027-08                        | Hg      | Water         | D     | 1.06    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701464  |
| 1746027-08                        | K       | Water         | D     | 254000  |           | 245   | 1020  | µg/L | B173378 | 1701627  |
| 1746027-08                        | Mg      | Water         | D     | 747000  |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-08                        | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-08                        | Mn      | Water         | D     | 7390    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-08                        | Na      | Water         | D     | 6580000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-08                        | Ni      | Water         | D     | 13.9    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-08                        | Pb      | Water         | D     | 0.378   |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-08                        | Si      | Water         | D     | 10900   |           | 224   | 449   | µg/L | B173378 | 1701627  |
| <b>PW-124+00-0-DS-111517</b>      |         |               |       |         |           |       |       |      |         |          |
| 1746027-09                        | As      | Water         | TR    | 5.22    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-09                        | Cu      | Water         | TR    | 5.52    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-09                        | Hg      | Water         | TR    | 5.53    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-09                        | Ni      | Water         | TR    | 8.85    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-09                        | Pb      | Water         | TR    | 2.26    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                            | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-124+00-0-DS-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-10                        | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-10                        | As      | Water         | D     | 4.55    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-10                        | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-10                        | As(V)   | Water         | D     | 3.53    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-10                        | Ca      | Water         | D     | 318000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-10                        | Cu      | Water         | D     | 3.41    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-10                        | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-10                        | Fe      | Water         | D     | ≤ 16.3  | U         | 16.3  | 163   | µg/L | B173378 | 1701552  |
| 1746027-10                        | Hg      | Water         | D     | 1.06    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701464  |
| 1746027-10                        | K       | Water         | D     | 278000  |           | 2450  | 10200 | µg/L | B173378 | 1701552  |
| 1746027-10                        | Mg      | Water         | D     | 913000  |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-10                        | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-10                        | Mn      | Water         | D     | 5.70    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-10                        | Na      | Water         | D     | 7710000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-10                        | Ni      | Water         | D     | 1.65    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-10                        | Pb      | Water         | D     | 0.625   |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-10                        | Si      | Water         | D     | 3040    | J         | 2240  | 4490  | µg/L | B173378 | 1701552  |
| <b>PW-125+00-ST1-DS-111517</b>    |         |               |       |         |           |       |       |      |         |          |
| 1746027-11                        | As      | Water         | TR    | 10.7    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-11                        | Cu      | Water         | TR    | 3.52    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-11                        | Hg      | Water         | TR    | 14.2    |           | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-11                        | Ni      | Water         | TR    | 1.72    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-11                        | Pb      | Water         | TR    | 19.1    | J-1       | 0.101 | 0.303 | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                              | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-------------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-125+00-ST1-DS-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-12                          | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-12                          | As      | Water         | D     | 6.38    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-12                          | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-12                          | As(V)   | Water         | D     | 1.80    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-12                          | Ca      | Water         | D     | 358000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-12                          | Cu      | Water         | D     | 1.25    | J         | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-12                          | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-12                          | Fe      | Water         | D     | 322     |           | 16.3  | 163   | µg/L | B173378 | 1701552  |
| 1746027-12                          | Hg      | Water         | D     | 0.37    | J         | 0.10  | 0.40  | ng/L | B173158 | 1701464  |
| 1746027-12                          | K       | Water         | D     | 323000  |           | 2450  | 10200 | µg/L | B173378 | 1701552  |
| 1746027-12                          | Mg      | Water         | D     | 1060000 |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-12                          | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-12                          | Mn      | Water         | D     | 34.9    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-12                          | Na      | Water         | D     | 8980000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-12                          | Ni      | Water         | D     | 0.848   |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-12                          | Pb      | Water         | D     | 0.675   |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-12                          | Si      | Water         | D     | ≤ 2240  | U         | 2240  | 4490  | µg/L | B173378 | 1701552  |
| <b>PW-125+00-SW-111517</b>          |         |               |       |         |           |       |       |      |         |          |
| 1746027-13                          | As      | Water         | TR    | 4.24    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-13                          | Cu      | Water         | TR    | 6.03    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-13                          | Hg      | Water         | TR    | 3.35    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-13                          | Ni      | Water         | TR    | 0.888   |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-13                          | Pb      | Water         | TR    | 0.842   |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |





## Sample Results

| Sample                          | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|---------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-125+00-SW-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-14                      | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-14                      | As      | Water         | D     | 2.55    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-14                      | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-14                      | As(V)   | Water         | D     | 2.05    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-14                      | Ca      | Water         | D     | 363000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-14                      | Cu      | Water         | D     | 2.13    | J         | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-14                      | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-14                      | Fe      | Water         | D     | ≤ 16.3  | U         | 16.3  | 163   | µg/L | B173378 | 1701552  |
| 1746027-14                      | Hg      | Water         | D     | 0.12    | J         | 0.10  | 0.40  | ng/L | B173158 | 1701464  |
| 1746027-14                      | K       | Water         | D     | 329000  |           | 2450  | 10200 | µg/L | B173378 | 1701552  |
| 1746027-14                      | Mg      | Water         | D     | 1070000 |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-14                      | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-14                      | Mn      | Water         | D     | 5.43    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-14                      | Na      | Water         | D     | 9040000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-14                      | Ni      | Water         | D     | 0.680   |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-14                      | Pb      | Water         | D     | 0.265   | J         | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-14                      | Si      | Water         | D     | ≤ 2240  | U         | 2240  | 4490  | µg/L | B173378 | 1701552  |
| <b>PW-125+50-0-DS-111517</b>    |         |               |       |         |           |       |       |      |         |          |
| 1746027-15                      | As      | Water         | TR    | 32.2    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-15                      | Cu      | Water         | TR    | 5.71    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-15                      | Hg      | Water         | TR    | 6.30    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-15                      | Ni      | Water         | TR    | 2.74    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-15                      | Pb      | Water         | TR    | 3.44    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |





## Sample Results

| Sample                            | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-125+50-0-DS-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-16                        | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-16                        | As      | Water         | D     | 39.4    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-16                        | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-16                        | As(V)   | Water         | D     | 41.8    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-16                        | Ca      | Water         | D     | 335000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-16                        | Cu      | Water         | D     | 2.00    | J         | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-16                        | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-16                        | Fe      | Water         | D     | ≤ 16.3  | U         | 16.3  | 163   | µg/L | B173378 | 1701552  |
| 1746027-16                        | Hg      | Water         | D     | 1.76    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701464  |
| 1746027-16                        | K       | Water         | D     | 295000  |           | 2450  | 10200 | µg/L | B173378 | 1701552  |
| 1746027-16                        | Mg      | Water         | D     | 976000  |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-16                        | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-16                        | Mn      | Water         | D     | 11.6    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-16                        | Na      | Water         | D     | 8300000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-16                        | Ni      | Water         | D     | 4.34    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-16                        | Pb      | Water         | D     | 2.06    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-16                        | Si      | Water         | D     | ≤ 2240  | U         | 2240  | 4490  | µg/L | B173378 | 1701552  |
| <b>PW-126+90-0-DS-111517</b>      |         |               |       |         |           |       |       |      |         |          |
| 1746027-17                        | As      | Water         | TR    | 27.2    |           | 0.449 | 1.63  | µg/L | B173378 | 1701552  |
| 1746027-17                        | Cu      | Water         | TR    | 5.85    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-17                        | Hg      | Water         | TR    | 3.89    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-17                        | Ni      | Water         | TR    | 3.76    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-17                        | Pb      | Water         | TR    | 6.29    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                            | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-126+90-0-DS-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-18                        | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-18                        | As      | Water         | D     | 20.2    |           | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-18                        | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-18                        | As(V)   | Water         | D     | 25.9    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-18                        | Ca      | Water         | D     | 319000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-18                        | Cu      | Water         | D     | 2.29    | J         | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-18                        | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-18                        | Fe      | Water         | D     | ≤ 40.8  | U         | 40.8  | 408   | µg/L | B173378 | 1701627  |
| 1746027-18                        | Hg      | Water         | D     | 0.64    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-18                        | K       | Water         | D     | 316000  |           | 245   | 1020  | µg/L | B173378 | 1701627  |
| 1746027-18                        | Mg      | Water         | D     | 926000  |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-18                        | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-18                        | Mn      | Water         | D     | 7.34    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-18                        | Na      | Water         | D     | 7960000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-18                        | Ni      | Water         | D     | 1.15    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-18                        | Pb      | Water         | D     | 1.35    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-18                        | Si      | Water         | D     | 3970    |           | 224   | 449   | µg/L | B173378 | 1701627  |
| <b>PW-128+30-0-DS-111517</b>      |         |               |       |         |           |       |       |      |         |          |
| 1746027-19                        | As      | Water         | TR    | 6.99    |           | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-19                        | Cu      | Water         | TR    | 9.02    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-19                        | Hg      | Water         | TR    | 4.42    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-19                        | Ni      | Water         | TR    | 13.2    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-19                        | Pb      | Water         | TR    | 0.719   |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                            | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-----------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-128+30-0-DS-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-20                        | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-20                        | As      | Water         | D     | 3.39    | J         | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-20                        | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-20                        | As(V)   | Water         | D     | 4.51    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-20                        | Ca      | Water         | D     | 309000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-20                        | Cu      | Water         | D     | 2.72    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-20                        | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-20                        | Fe      | Water         | D     | ≤ 40.8  | U         | 40.8  | 408   | µg/L | B173378 | 1701627  |
| 1746027-20                        | Hg      | Water         | D     | 0.97    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-20                        | K       | Water         | D     | 206000  |           | 245   | 1020  | µg/L | B173378 | 1701627  |
| 1746027-20                        | Mg      | Water         | D     | 884000  |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-20                        | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-20                        | Mn      | Water         | D     | 15.6    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-20                        | Na      | Water         | D     | 7660000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-20                        | Ni      | Water         | D     | 12.9    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-20                        | Pb      | Water         | D     | 0.780   |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-20                        | Si      | Water         | D     | 3320    |           | 224   | 449   | µg/L | B173378 | 1701627  |
| <b>PW-128+50-ST1-DS-111517</b>    |         |               |       |         |           |       |       |      |         |          |
| 1746027-21                        | As      | Water         | TR    | 15.3    |           | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-21                        | Cu      | Water         | TR    | 5.99    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-21                        | Hg      | Water         | TR    | 6.16    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-21                        | Ni      | Water         | TR    | 2.05    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-21                        | Pb      | Water         | TR    | 2.19    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                              | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|-------------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-128+50-ST1-DS-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-22                          | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-22                          | As      | Water         | D     | 5.63    |           | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-22                          | As(III) | Water         | D     | 14.3    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-22                          | As(V)   | Water         | D     | 4.05    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-22                          | Ca      | Water         | D     | 349000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-22                          | Cu      | Water         | D     | 1.10    | J         | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-22                          | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-22                          | Fe      | Water         | D     | 46.6    | J         | 40.8  | 408   | µg/L | B173378 | 1701627  |
| 1746027-22                          | Hg      | Water         | D     | 0.76    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-22                          | K       | Water         | D     | 242000  |           | 245   | 1020  | µg/L | B173378 | 1701627  |
| 1746027-22                          | Mg      | Water         | D     | 1020000 |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-22                          | MMAAs   | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-22                          | Mn      | Water         | D     | 76.7    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-22                          | Na      | Water         | D     | 8760000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-22                          | Ni      | Water         | D     | 2.74    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-22                          | Pb      | Water         | D     | 0.455   |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-22                          | Si      | Water         | D     | 3000    |           | 224   | 449   | µg/L | B173378 | 1701627  |
| <b>PW-128+50-SW-111517</b>          |         |               |       |         |           |       |       |      |         |          |
| 1746027-23                          | As      | Water         | TR    | 3.64    | J         | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-23                          | Cu      | Water         | TR    | 4.67    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-23                          | Hg      | Water         | TR    | 1.55    | J-1       | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-23                          | Ni      | Water         | TR    | 1.47    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-23                          | Pb      | Water         | TR    | 3.64    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |



## Sample Results

| Sample                          | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit | Batch   | Sequence |
|---------------------------------|---------|---------------|-------|---------|-----------|-------|-------|------|---------|----------|
| <b>PW-128+50-SW-111517-(20)</b> |         |               |       |         |           |       |       |      |         |          |
| 1746027-24                      | Al      | Water         | D     | ≤ 20.4  | U         | 20.4  | 81.6  | µg/L | B173378 | 1701552  |
| 1746027-24                      | As      | Water         | D     | 2.36    | J         | 1.12  | 4.08  | µg/L | B173378 | 1701627  |
| 1746027-24                      | As(III) | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-24                      | As(V)   | Water         | D     | 1.99    |           | 0.200 | 1.00  | µg/L | B173167 | 1701450  |
| 1746027-24                      | Ca      | Water         | D     | 357000  |           | 4690  | 14100 | µg/L | B173378 | 1701552  |
| 1746027-24                      | Cu      | Water         | D     | 4.27    |           | 0.898 | 2.69  | µg/L | B173175 | 1701537  |
| 1746027-24                      | DMAs    | Water         | D     | ≤ 0.250 | U         | 0.250 | 1.05  | µg/L | B173167 | 1701450  |
| 1746027-24                      | Fe      | Water         | D     | ≤ 40.8  | U         | 40.8  | 408   | µg/L | B173378 | 1701627  |
| 1746027-24                      | Hg      | Water         | D     | ≤ 0.10  | U         | 0.10  | 0.40  | ng/L | B173158 | 1701452  |
| 1746027-24                      | K       | Water         | D     | 313000  |           | 245   | 1020  | µg/L | B173378 | 1701627  |
| 1746027-24                      | Mg      | Water         | D     | 1050000 |           | 551   | 1730  | µg/L | B173378 | 1701552  |
| 1746027-24                      | MMAs    | Water         | D     | ≤ 0.200 | U         | 0.200 | 1.15  | µg/L | B173167 | 1701450  |
| 1746027-24                      | Mn      | Water         | D     | 9.12    |           | 0.857 | 2.57  | µg/L | B173175 | 1701537  |
| 1746027-24                      | Na      | Water         | D     | 8950000 |           | 408   | 4080  | µg/L | B173378 | 1701552  |
| 1746027-24                      | Ni      | Water         | D     | 5.00    |           | 0.141 | 0.606 | µg/L | B173176 | 1701485  |
| 1746027-24                      | Pb      | Water         | D     | 2.77    |           | 0.101 | 0.303 | µg/L | B173176 | 1701485  |
| 1746027-24                      | Si      | Water         | D     | 2150    |           | 224   | 449   | µg/L | B173378 | 1701627  |



## Accuracy & Precision Summary

**Batch:** B173158  
**Lab Matrix:** Water  
**Method:** EPA 1631 E

| Sample              | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|--|--------|-------|--------|-------|--------------|--------------|
| <b>B173158-SRM1</b> | <b>Standard Reference Material (1745012, THg SRM NIST 1641d)</b><br>Hg |        | 15.68 | 15.57  | ng/L  | 99% 80-120   |              |
| <b>B173158-MS1</b>  | <b>Matrix Spike (1746021-01)</b><br>Hg                                 | 0.62   | 12.12 | 12.76  | ng/L  | 100% 71-125  |              |
| <b>B173158-MSD1</b> | <b>Matrix Spike Duplicate (1746021-01)</b><br>Hg                       | 0.62   | 12.12 | 13.11  | ng/L  | 103% 71-125  | 3% 24        |
| <b>B173158-MS6</b>  | <b>Matrix Spike (1746027-05)</b><br>Hg                                 | 10.29  | 30.30 | 39.14  | ng/L  | 95% 71-125   |              |
| <b>B173158-MSD6</b> | <b>Matrix Spike Duplicate (1746027-05)</b><br>Hg                       | 10.29  | 30.30 | 38.70  | ng/L  | 94% 71-125   | 1% 24        |



## Accuracy & Precision Summary

Batch: B173167  
 Lab Matrix: Water  
 Method: SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173167-BS1  | <b>Blank Spike, (1736006)</b>               |        |       |        |       |              |              |
|              | As(III)                                     |        | 5.010 | 5.211  | µg/L  | 104% 75-125  |              |
|              | As(V)                                       |        | 5.000 | 5.291  | µg/L  | 106% 75-125  |              |
|              | DMAs  |        | 3.198 | 2.929  | µg/L  | 92% 75-125   |              |
| B173167-BS2  | <b>Blank Spike, (1714054)</b>               |        |       |        |       |              |              |
|              | MMAAs                                       |        | 4.634 | 4.652  | µg/L  | 100% 75-125  |              |
| B173167-DUP1 | <b>Duplicate, (1746027-12)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | As(V)                                       | 1.796  |       | 1.695  | µg/L  |              | 6% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B173167-MS1  | <b>Matrix Spike, (1746027-12)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 52.01  | µg/L  | 104% 75-125  |              |
|              | As(V)                                       | 1.796  | 50.00 | 48.81  | µg/L  | 94% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 53.03  | µg/L  | 104% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 50.15  | µg/L  | 100% 75-125  |              |
| B173167-MSD1 | <b>Matrix Spike Duplicate, (1746027-12)</b> |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 52.04  | µg/L  | 104% 75-125  | 0.05% 25     |
|              | As(V)                                       | 1.796  | 50.00 | 50.55  | µg/L  | 98% 75-125   | 3% 25        |
|              | DMAs  | ND     | 51.00 | 53.74  | µg/L  | 105% 75-125  | 1% 25        |
|              | MMAAs                                       | ND     | 50.00 | 51.11  | µg/L  | 102% 75-125  | 2% 25        |
| B173167-DUP2 | <b>Duplicate, (1746027-24)</b>              |        |       |        |       |              |              |
|              | As(III)                                     | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | As(V)                                       | 1.986  |       | 2.046  | µg/L  |              | 3% 25        |
|              | DMAs  | ND     |       | ND     | µg/L  |              | N/C 25       |
|              | MMAAs                                       | ND     |       | ND     | µg/L  |              | N/C 25       |
| B173167-MS2  | <b>Matrix Spike, (1746027-24)</b>           |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 52.32  | µg/L  | 105% 75-125  |              |
|              | As(V)                                       | 1.986  | 50.00 | 51.11  | µg/L  | 98% 75-125   |              |
|              | DMAs  | ND     | 51.00 | 51.75  | µg/L  | 101% 75-125  |              |
|              | MMAAs                                       | ND     | 50.00 | 51.11  | µg/L  | 102% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B173167  
**Lab Matrix:** Water  
**Method:** SOP BAL-4100

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173167-MSD2 | <b>Matrix Spike Duplicate, (1746027-24)</b> |        |       |        |       |              |              |
|              | As(III)                                     | ND     | 50.00 | 52.31  | µg/L  | 105% 75-125  | 0.03% 25     |
|              | As(V)                                       | 1.986  | 50.00 | 52.11  | µg/L  | 100% 75-125  | 2% 25        |
|              | DMAs  | ND     | 51.00 | 52.59  | µg/L  | 103% 75-125  | 2% 25        |
|              | MMA   | ND     | 50.00 | 50.22  | µg/L  | 100% 75-125  | 2% 25        |





## Accuracy & Precision Summary

Batch: B173175  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B173175-BS1  | <b>Blank Spike, (1747054)</b>  |        |       |        |       |              |              |
|              | Cu   |        | 25.00 | 21.20  | µg/L  | 85% 75-125   |              |
|              | Mn   |        | 25.00 | 20.77  | µg/L  | 83% 75-125   |              |
| B173175-BS2  | <b>Blank Spike, (1747054)</b>  |        |       |        |       |              |              |
|              | Cu   |        | 25.00 | 21.32  | µg/L  | 85% 75-125   |              |
|              | Mn   |        | 25.00 | 21.18  | µg/L  | 85% 75-125   |              |
| B173175-BS3  | <b>Blank Spike, (1747054)</b>  |        |       |        |       |              |              |
|              | Cu   |        | 25.00 | 21.37  | µg/L  | 85% 75-125   |              |
|              | Mn   |        | 25.00 | 21.23  | µg/L  | 85% 75-125   |              |
| B173175-SRM1 | <b>Standard Reference Material (1724009, T221 as SRM)</b>            |        |       |        |       |              |              |
|              | Cu   |        | 3.780 | 4.231  | µg/L  | 112% 75-125  |              |
|              | Mn   |        | 33.60 | 35.34  | µg/L  | 105% 75-125  |              |
| B173175-SRM2 | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |        |       |        |       |              |              |
|              | Cu   |        | 85.75 | 89.54  | µg/L  | 104% 75-125  |              |
|              | Mn   |        | 40.39 | 41.34  | µg/L  | 102% 75-125  |              |
| B173175-DUP4 | <b>Duplicate, (1746027-05)</b>                                       |        |       |        |       |              |              |
|              | Cu   | 5.366  |       | 5.646  | µg/L  |              | 5% 20        |
|              | Mn   | 28.83  |       | 28.82  | µg/L  |              | 0.04% 20     |
| B173175-MS4  | <b>Matrix Spike, (1746027-05)</b>                                    |        |       |        |       |              |              |
|              | Cu   | 5.366  | 1020  | 899.0  | µg/L  | 88% 75-125   |              |
|              | Mn   | 28.83  | 1020  | 957.7  | µg/L  | 91% 75-125   |              |
| B173175-MSD4 | <b>Matrix Spike Duplicate, (1746027-05)</b>                          |        |       |        |       |              |              |
|              | Cu   | 5.366  | 1020  | 897.2  | µg/L  | 87% 75-125   | 0.2% 20      |
|              | Mn   | 28.83  | 1020  | 941.0  | µg/L  | 89% 75-125   | 2% 20        |
| B173175-DUP5 | <b>Duplicate, (1746027-17)</b>                                       |        |       |        |       |              |              |
|              | Cu   | 5.847  |       | 6.393  | µg/L  |              | 9% 20        |
|              | Mn   | 71.92  |       | 73.10  | µg/L  |              | 2% 20        |



## Accuracy & Precision Summary

Batch: B173175  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173175-MS5  | <b>Matrix Spike, (1746027-17)</b>           |        |       |        |       |              |              |
|              | Cu  | 5.847  | 1020  | 910.2  | µg/L  | 89% 75-125   |              |
|              | Mn  | 71.92  | 1020  | 999.1  | µg/L  | 91% 75-125   |              |
| B173175-MSD5 | <b>Matrix Spike Duplicate, (1746027-17)</b> |        |       |        |       |              |              |
|              | Cu  | 5.847  | 1020  | 903.3  | µg/L  | 88% 75-125   | 0.8% 20      |
|              | Mn  | 71.92  | 1020  | 1003   | µg/L  | 91% 75-125   | 0.4% 20      |
| B173175-DUP6 | <b>Duplicate, (1746027-23)</b>              |        |       |        |       |              |              |
|              | Cu  | 4.667  |       | 4.561  | µg/L  |              | 2% 20        |
|              | Mn  | 18.74  |       | 19.52  | µg/L  |              | 4% 20        |
| B173175-MS6  | <b>Matrix Spike, (1746027-23)</b>           |        |       |        |       |              |              |
|              | Cu  | 4.667  | 1020  | 913.2  | µg/L  | 89% 75-125   |              |
|              | Mn  | 18.74  | 1020  | 948.9  | µg/L  | 91% 75-125   |              |
| B173175-MSD6 | <b>Matrix Spike Duplicate, (1746027-23)</b> |        |       |        |       |              |              |
|              | Cu  | 4.667  | 1020  | 917.8  | µg/L  | 89% 75-125   | 0.5% 20      |
|              | Mn  | 18.74  | 1020  | 961.5  | µg/L  | 92% 75-125   | 1% 20        |



## Accuracy & Precision Summary

Batch: B173176  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte  | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|--------|--------|-------|--------------|--------------|
| B173176-BS1  | <b>Blank Spike, (1722014)</b>                        |        |        |        |       |              |              |
|              | Ni   |        | 0.5000 | 0.4855 | µg/L  | 97% 75-125   |              |
|              | Pb   |        | 0.5000 | 0.4791 | µg/L  | 96% 75-125   |              |
| B173176-BS2  | <b>Blank Spike, (1722014)</b>                        |        |        |        |       |              |              |
|              | Ni   |        | 0.5000 | 0.4836 | µg/L  | 97% 75-125   |              |
|              | Pb   |        | 0.5000 | 0.4830 | µg/L  | 97% 75-125   |              |
| B173176-SRM1 | <b>Standard Reference Material (1716086, NASS-7)</b> |        |        |        |       |              |              |
|              | Ni   |        | 0.2480 | 0.2245 | µg/L  | 91% 75-125   |              |
| B173176-SRM2 | <b>Standard Reference Material (1741023, SLEW-3)</b> |        |        |        |       |              |              |
|              | Ni   |        | 1.230  | 1.197  | µg/L  | 97% 70-130   |              |
| B173176-DUP1 | <b>Duplicate, (1746027-03)</b>                       |        |        |        |       |              |              |
|              | Ni   | 3.381  |        | 3.436  | µg/L  |              | 2% 20        |
|              | Pb   | 7.490  |        | 7.447  | µg/L  |              | 0.6% 20      |
| B173176-MS1  | <b>Matrix Spike, (1746027-03)</b>                    |        |        |        |       |              |              |
|              | Ni   | 3.381  | 10.10  | 13.26  | µg/L  | 98% 75-125   |              |
|              | Pb   | 7.490  | 10.10  | 17.35  | µg/L  | 98% 75-125   |              |
| B173176-MSD1 | <b>Matrix Spike Duplicate, (1746027-03)</b>          |        |        |        |       |              |              |
|              | Ni   | 3.381  | 10.10  | 13.48  | µg/L  | 100% 75-125  | 2% 20        |
|              | Pb   | 7.490  | 10.10  | 17.54  | µg/L  | 100% 75-125  | 1% 20        |
| B173176-DUP2 | <b>Duplicate, (1746027-13)</b>                       |        |        |        |       |              |              |
|              | Ni   | 0.8877 |        | 0.9046 | µg/L  |              | 2% 20        |
|              | Pb   | 0.8423 |        | 0.8423 | µg/L  |              | 0.0008% 20   |
| B173176-MS2  | <b>Matrix Spike, (1746027-13)</b>                    |        |        |        |       |              |              |
|              | Ni   | 0.8877 | 10.10  | 10.79  | µg/L  | 98% 75-125   |              |
|              | Pb   | 0.8423 | 10.10  | 10.67  | µg/L  | 97% 75-125   |              |



## Accuracy & Precision Summary

Batch: B173176  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte                                     | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B173176-MSD2 | <b>Matrix Spike Duplicate, (1746027-13)</b> |        |       |        |       |              |              |
|              | Ni  | 0.8877 | 10.10 | 10.87  | µg/L  | 99% 75-125   | 0.7% 20      |
|              | Pb  | 0.8423 | 10.10 | 11.03  | µg/L  | 101% 75-125  | 3% 20        |
| B173176-DUP3 | <b>Duplicate, (1746027-23)</b>              |        |       |        |       |              |              |
|              | Ni  | 1.474  |       | 1.485  | µg/L  |              | 0.8% 20      |
|              | Pb  | 3.643  |       | 3.654  | µg/L  |              | 0.3% 20      |
| B173176-MS3  | <b>Matrix Spike, (1746027-23)</b>           |        |       |        |       |              |              |
|              | Ni  | 1.474  | 10.10 | 11.47  | µg/L  | 99% 75-125   |              |
|              | Pb  | 3.643  | 10.10 | 13.60  | µg/L  | 99% 75-125   |              |
| B173176-MSD3 | <b>Matrix Spike Duplicate, (1746027-23)</b> |        |       |        |       |              |              |
|              | Ni  | 1.474  | 10.10 | 11.14  | µg/L  | 96% 75-125   | 3% 20        |
|              | Pb  | 3.643  | 10.10 | 13.44  | µg/L  | 97% 75-125   | 1% 20        |



## Accuracy & Precision Summary

Batch: B173378  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample      | Analyte                | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|------------------------|--------|-------|--------|-------|--------------|--------------|
| B173378-BS1 | Blank Spike, (1747054) |        |       |        |       |              |              |
|             | Al                     |        | 500.0 | 367.7  | µg/L  | 74% 75-125   |              |
|             | As                     |        | 25.00 | 22.27  | µg/L  | 89% 75-125   |              |
|             | Ca                     |        | 500.0 | 434.5  | µg/L  | 87% 75-125   |              |
|             | Fe                     |        | 500.0 | 392.4  | µg/L  | 78% 75-125   |              |
|             | K                      |        | 500.0 | 381.9  | µg/L  | 76% 75-125   |              |
|             | Mg                     |        | 500.0 | 384.4  | µg/L  | 77% 75-125   |              |
|             | Na                     |        | 500.0 | 395.6  | µg/L  | 79% 75-125   |              |
|             | Si                     |        | 250.0 | 226.8  | µg/L  | 91% 75-125   |              |
| B173378-BS2 | Blank Spike, (1747054) |        |       |        |       |              |              |
|             | Al                     |        | 500.0 | 365.8  | µg/L  | 73% 75-125   |              |
|             | As                     |        | 25.00 | 21.76  | µg/L  | 87% 75-125   |              |
|             | Ca                     |        | 500.0 | 433.1  | µg/L  | 87% 75-125   |              |
|             | Fe                     |        | 500.0 | 375.9  | µg/L  | 75% 75-125   |              |
|             | K                      |        | 500.0 | 369.2  | µg/L  | 74% 75-125   |              |
|             | Mg                     |        | 500.0 | 385.8  | µg/L  | 77% 75-125   |              |
|             | Na                     |        | 500.0 | 395.0  | µg/L  | 79% 75-125   |              |
|             | Si                     |        | 250.0 | 222.0  | µg/L  | 89% 75-125   |              |
| B173378-BS3 | Blank Spike, (1747054) |        |       |        |       |              |              |
|             | Al                     |        | 500.0 | 364.8  | µg/L  | 73% 75-125   |              |
|             | As                     |        | 25.00 | 22.21  | µg/L  | 89% 75-125   |              |
|             | Ca                     |        | 500.0 | 426.7  | µg/L  | 85% 75-125   |              |
|             | Fe                     |        | 500.0 | 390.1  | µg/L  | 78% 75-125   |              |
|             | K                      |        | 500.0 | 380.0  | µg/L  | 76% 75-125   |              |
|             | Mg                     |        | 500.0 | 383.3  | µg/L  | 77% 75-125   |              |
|             | Na                     |        | 500.0 | 394.3  | µg/L  | 79% 75-125   |              |
|             | Si                     |        | 250.0 | 222.4  | µg/L  | 89% 75-125   |              |



## Accuracy & Precision Summary

Batch: B173378  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte  | Native  | Spike | Result  | Units | REC & Limits | RPD & Limits |
|---------------------|--|---------|-------|---------|-------|--------------|--------------|
| <b>B173378-SRM1</b> | <b>Standard Reference Material (1724009, T221 as SRM)</b>            |         |       |         |       |              |              |
|                     | Al   |         | 374.0 | 356.7   | µg/L  | 95% 75-125   |              |
|                     | As   |         | 17.70 | 20.77   | µg/L  | 117% 75-125  |              |
|                     | Ca   |         | 16700 | 17910   | µg/L  | 107% 75-125  |              |
|                     | Fe   |         | 328.0 | 330.6   | µg/L  | 101% 75-125  |              |
|                     | K  |         | 1900  | 1883    | µg/L  | 99% 75-125   |              |
|                     | Mg   |         | 3770  | 3658    | µg/L  | 97% 75-125   |              |
|                     | Na   |         | 17400 | 17420   | µg/L  | 100% 75-125  |              |
|                     | Si   |         | 5843  | 7169    | µg/L  | 123% 75-125  |              |
| <b>B173378-SRM2</b> | <b>Standard Reference Material (1743005, NIST 1640a (batch SRM))</b> |         |       |         |       |              |              |
|                     | Al   |         | 53.00 | 49.63   | µg/L  | 94% 75-125   |              |
|                     | As   |         | 8.075 | 9.017   | µg/L  | 112% 75-125  |              |
|                     | Ca   |         | 5615  | 5820    | µg/L  | 104% N/A     |              |
|                     | Fe   |         | 36.80 | 33.58   | µg/L  | 91% 75-125   |              |
|                     | K  |         | 579.9 | 569.8   | µg/L  | 98% 0-200    |              |
|                     | Mg   |         | 1059  | 981.7   | µg/L  | 93% N/A      |              |
|                     | Na   |         | 3137  | 3064    | µg/L  | 98% N/A      |              |
|                     | Si   |         | 5210  | 5969    | µg/L  | 115% N/A     |              |
| <b>B173378-DUP1</b> | <b>Duplicate, (1746027-05)</b>                                       |         |       |         |       |              |              |
|                     | Ca   | 369000  |       | 344900  | µg/L  |              | 7% 20        |
|                     | K  | 334500  |       | 315500  | µg/L  |              | 6% 20        |
|                     | Mg   | 1094000 |       | 1022000 | µg/L  |              | 7% 20        |
|                     | Na   | 9201000 |       | 8686000 | µg/L  |              | 6% 20        |
|                     | Si   | 3137    |       | 2822    | µg/L  |              | 11% 20       |
| <b>B173378-DUP4</b> | <b>Duplicate, (1746027-05)</b>                                       |         |       |         |       |              |              |
|                     | Al   | 860.8   |       | 865.5   | µg/L  |              | 0.5% 20      |
|                     | As   | 4.359   |       | 4.509   | µg/L  |              | 3% 20        |
|                     | Fe   | 887.0   |       | 893.6   | µg/L  |              | 0.7% 20      |



## Accuracy & Precision Summary

Batch: B173378  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native  | Spike   | Result  | Units | REC & Limits | RPD & Limits |
|---------------------|---|---------|---------|---------|-------|--------------|--------------|
| <b>B173378-MS1</b>  | <b>Matrix Spike, (1746027-05)</b>           |         |         |         |       |              |              |
|                     | Ca  | 369000  | 102000  | 452700  | µg/L  | 82% 75-125   |              |
|                     | K   | 334500  | 102000  | 409300  | µg/L  | 73% 75-125   |              |
|                     | Mg  | 1094000 | 102000  | 1112000 | µg/L  | NR 75-125    |              |
|                     | Na  | 9201000 | 102000  | 8682000 | µg/L  | NR 75-125    |              |
|                     | Si  | 3137    | 1020000 | 1204000 | µg/L  | 118% 75-125  |              |
| <b>B173378-MS4</b>  | <b>Matrix Spike, (1746027-05)</b>           |         |         |         |       |              |              |
|                     | Al  | 860.8   | 4082    | 5319    | µg/L  | 109% 75-125  |              |
|                     | As  | 4.359   | 408.2   | 504.9   | µg/L  | 123% 75-125  |              |
|                     | Fe  | 887.0   | 4082    | 5240    | µg/L  | 107% 75-125  |              |
| <b>B173378-MSD1</b> | <b>Matrix Spike Duplicate, (1746027-05)</b> |         |         |         |       |              |              |
|                     | Ca  | 369000  | 102000  | 467200  | µg/L  | 96% 75-125   | 3% 20        |
|                     | K   | 334500  | 102000  | 428100  | µg/L  | 92% 75-125   | 4% 20        |
|                     | Mg  | 1094000 | 102000  | 1171000 | µg/L  | NR 75-125    | N/C 20       |
|                     | Na  | 9201000 | 102000  | 9162000 | µg/L  | NR 75-125    | N/C 20       |
|                     | Si  | 3137    | 1020000 | 1194000 | µg/L  | 117% 75-125  | 0.9% 20      |
| <b>B173378-MSD4</b> | <b>Matrix Spike Duplicate, (1746027-05)</b> |         |         |         |       |              |              |
|                     | Al  | 860.8   | 4082    | 5297    | µg/L  | 109% 75-125  | 0.4% 20      |
|                     | As  | 4.359   | 408.2   | 501.1   | µg/L  | 122% 75-125  | 0.7% 20      |
|                     | Fe  | 887.0   | 4082    | 5192    | µg/L  | 105% 75-125  | 0.9% 20      |
| <b>B173378-DUP2</b> | <b>Duplicate, (1746027-17)</b>              |         |         |         |       |              |              |
|                     | Ca  | 317500  |         | 316300  | µg/L  |              | 0.4% 20      |
|                     | Mg  | 922800  |         | 927400  | µg/L  |              | 0.5% 20      |
|                     | Na  | 7885000 |         | 7897000 | µg/L  |              | 0.2% 20      |
| <b>B173378-DUP5</b> | <b>Duplicate, (1746027-17)</b>              |         |         |         |       |              |              |
|                     | Al  | 658.1   |         | 656.7   | µg/L  |              | 0.2% 20      |
|                     | As  | 27.19   |         | 27.73   | µg/L  |              | 2% 20        |
| <b>B173378-MS2</b>  | <b>Matrix Spike, (1746027-17)</b>           |         |         |         |       |              |              |
|                     | Ca  | 317500  | 102000  | 429000  | µg/L  | 109% 75-125  |              |
|                     | Mg  | 922800  | 102000  | 1024000 | µg/L  | NR 75-125    |              |
|                     | Na  | 7885000 | 102000  | 8000000 | µg/L  | NR 75-125    |              |



## Accuracy & Precision Summary

Batch: B173378  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                                     | Native  | Spike  | Result  | Units | REC & Limits | RPD & Limits |
|--------------|---|---------|--------|---------|-------|--------------|--------------|
| B173378-MS5  | <b>Matrix Spike, (1746027-17)</b>           |         |        |         |       |              |              |
|              | Al  | 658.1   | 4082   | 5140    | µg/L  | 110% 75-125  |              |
|              | As  | 27.19   | 408.2  | 516.6   | µg/L  | 120% 75-125  |              |
| B173378-MSD2 | <b>Matrix Spike Duplicate, (1746027-17)</b> |         |        |         |       |              |              |
|              | Ca  | 317500  | 102000 | 431200  | µg/L  | 111% 75-125  | 0.5% 20      |
|              | Mg  | 922800  | 102000 | 1034000 | µg/L  | NR 75-125    | N/C 20       |
|              | Na  | 7885000 | 102000 | 8083000 | µg/L  | NR 75-125    | N/C 20       |
| B173378-MSD5 | <b>Matrix Spike Duplicate, (1746027-17)</b> |         |        |         |       |              |              |
|              | Al  | 658.1   | 4082   | 5158    | µg/L  | 110% 75-125  | 0.3% 20      |
|              | As  | 27.19   | 408.2  | 518.5   | µg/L  | 120% 75-125  | 0.4% 20      |
| B173378-DUP3 | <b>Duplicate, (1746027-23)</b>              |         |        |         |       |              |              |
|              | Ca  | 364700  |        | 360500  | µg/L  |              | 1% 20        |
|              | Mg  | 1067000 |        | 1069000 | µg/L  |              | 0.2% 20      |
|              | Na  | 9119000 |        | 9074000 | µg/L  |              | 0.5% 20      |
| B173378-DUP6 | <b>Duplicate, (1746027-23)</b>              |         |        |         |       |              |              |
|              | Al  | 988.4   |        | 985.7   | µg/L  |              | 0.3% 20      |
| B173378-DUP8 | <b>Duplicate, (1746027-23)</b>              |         |        |         |       |              |              |
|              | As  | 3.641   |        | 3.639   | µg/L  |              | 0.07% 20     |
|              | Fe  | 667.2   |        | 667.9   | µg/L  |              | 0.1% 20      |
|              | K   | 366900  |        | 374500  | µg/L  |              | 2% 20        |
|              | Si  | 5276    |        | 5182    | µg/L  |              | 2% 20        |
| B173378-MS3  | <b>Matrix Spike, (1746027-23)</b>           |         |        |         |       |              |              |
|              | Ca  | 364700  | 102000 | 472500  | µg/L  | 106% 75-125  |              |
|              | Mg  | 1067000 | 102000 | 1174000 | µg/L  | NR 75-125    |              |
|              | Na  | 9119000 | 102000 | 9268000 | µg/L  | NR 75-125    |              |
| B173378-MS6  | <b>Matrix Spike, (1746027-23)</b>           |         |        |         |       |              |              |
|              | Al  | 988.4   | 4082   | 5572    | µg/L  | 112% 75-125  |              |





## Accuracy & Precision Summary

Batch: B173378  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample              | Analyte                                     | Native  | Spike  | Result  | Units | REC & Limits | RPD & Limits |
|---------------------|---|---------|--------|---------|-------|--------------|--------------|
| <b>B173378-MS8</b>  | <b>Matrix Spike, (1746027-23)</b>           |         |        |         |       |              |              |
|                     | As  | 3.641   | 1020   | 1173    | µg/L  | 115% 75-125  |              |
|                     | Fe  | 667.2   | 10200  | 11680   | µg/L  | 108% 75-125  |              |
|                     | K   | 366900  | 10200  | 382300  | µg/L  | NR 75-125    |              |
|                     | Si  | 5276    | 102000 | 121000  | µg/L  | 113% 75-125  |              |
| <b>B173378-MSD3</b> | <b>Matrix Spike Duplicate, (1746027-23)</b> |         |        |         |       |              |              |
|                     | Ca  | 364700  | 102000 | 469700  | µg/L  | 103% 75-125  | 0.6% 20      |
|                     | Mg  | 1067000 | 102000 | 1168000 | µg/L  | NR 75-125    | N/C 20       |
|                     | Na  | 9119000 | 102000 | 9282000 | µg/L  | NR 75-125    | N/C 20       |
| <b>B173378-MSD6</b> | <b>Matrix Spike Duplicate, (1746027-23)</b> |         |        |         |       |              |              |
|                     | Al  | 988.4   | 4082   | 5551    | µg/L  | 112% 75-125  | 0.4% 20      |
| <b>B173378-MSD8</b> | <b>Matrix Spike Duplicate, (1746027-23)</b> |         |        |         |       |              |              |
|                     | As  | 3.641   | 1020   | 1234    | µg/L  | 121% 75-125  | 5% 20        |
|                     | Fe  | 667.2   | 10200  | 11980   | µg/L  | 111% 75-125  | 3% 20        |
|                     | K   | 366900  | 10200  | 389300  | µg/L  | NR 75-125    | N/C 20       |
|                     | Si  | 5276    | 102000 | 126200  | µg/L  | 119% 75-125  | 4% 20        |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B173158  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample               | Result | Units |                                 |                  |
|----------------------|--------|-------|---------------------------------|------------------|
| B173158-BLK1         | 0.97   | ng/L  |                                 |                  |
| B173158-BLK2         | 0.93   | ng/L  |                                 |                  |
| B173158-BLK3         | 0.93   | ng/L  |                                 |                  |
| B173158-BLK4         | 0.95   | ng/L  |                                 |                  |
| <b>Average:</b> 0.95 |        |       | <b>Standard Deviation:</b> 0.02 | <b>MDL:</b> 0.10 |
| <b>Limit:</b> 0.50   |        |       | <b>Limit:</b> 0.10              | <b>MRL:</b> 0.40 |



## Method Blanks & Reporting Limits

**Batch:** B173167  
**Matrix:** Water  
**Method:** SOP BAL-4100  
**Analyte:** As(III)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173167-BLK1    | 0.00         | µg/L  |                   |
| B173167-BLK2    | 0.00         | µg/L  |                   |
| B173167-BLK3    | 0.00         | µg/L  |                   |
| B173167-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** As(V)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173167-BLK1    | 0.00         | µg/L  |                   |
| B173167-BLK2    | 0.00         | µg/L  |                   |
| B173167-BLK3    | 0.0001       | µg/L  |                   |
| B173167-BLK4    | 0.0003       | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.004</b> |
| <b>Limit:</b>   | <b>0.020</b> |       | <b>MRL: 0.020</b> |

**Analyte:** DMA5

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B173167-BLK1    | 0.00         | µg/L  |                   |
| B173167-BLK2    | 0.00         | µg/L  |                   |
| B173167-BLK3    | 0.00         | µg/L  |                   |
| B173167-BLK4    | 0.00         | µg/L  |                   |
| <b>Average:</b> | <b>0.000</b> |       | <b>MDL: 0.005</b> |
| <b>Limit:</b>   | <b>0.021</b> |       | <b>MRL: 0.021</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** MMAs

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B173167-BLK1    | 0.00          | µg/L         |                   |
| B173167-BLK2    | 0.00          | µg/L         |                   |
| B173167-BLK3    | 0.00          | µg/L         |                   |
| B173167-BLK4    | 0.00          | µg/L         |                   |
| <b>Average:</b> | <b>0.000</b>  |              | <b>MDL:</b> 0.004 |
| <b>Limit:</b>   | <b>0.023</b>  |              | <b>MRL:</b> 0.023 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B173175  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Cu

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173175-BLK1    | 0.003  | µg/L  |                   |
| B173175-BLK2    | 0.008  | µg/L  |                   |
| B173175-BLK3    | 0.013  | µg/L  |                   |
| B173175-BLK4    | 0.019  | µg/L  |                   |
| <b>Average:</b> | 0.011  |       | <b>MDL:</b> 0.022 |
| <b>Limit:</b>   | 0.066  |       | <b>MRL:</b> 0.066 |

**Analyte:** Mn

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173175-BLK1    | -0.004 | µg/L  |                   |
| B173175-BLK2    | -0.001 | µg/L  |                   |
| B173175-BLK3    | -0.002 | µg/L  |                   |
| B173175-BLK4    | -0.003 | µg/L  |                   |
| <b>Average:</b> | -0.003 |       | <b>MDL:</b> 0.021 |
| <b>Limit:</b>   | 0.063  |       | <b>MRL:</b> 0.063 |



## Method Blanks & Reporting Limits

**Batch:** B173176  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Ni

| Sample          | Result | Units |                    |
|-----------------|--------|-------|--------------------|
| B173176-BLK1    | 0.0007 | µg/L  |                    |
| B173176-BLK2    | 0.0017 | µg/L  |                    |
| B173176-BLK3    | 0.0025 | µg/L  |                    |
| B173176-BLK4    | 0.0006 | µg/L  |                    |
| <b>Average:</b> | 0.0014 |       | <b>MDL:</b> 0.0070 |
| <b>Limit:</b>   | 0.0300 |       | <b>MRL:</b> 0.0300 |

**Analyte:** Pb

| Sample          | Result   | Units |                    |
|-----------------|----------|-------|--------------------|
| B173176-BLK1    | -0.0001  | µg/L  |                    |
| B173176-BLK2    | -0.0001  | µg/L  |                    |
| B173176-BLK3    | -0.0001  | µg/L  |                    |
| B173176-BLK4    | -0.00005 | µg/L  |                    |
| <b>Average:</b> | -0.0001  |       | <b>MDL:</b> 0.0050 |
| <b>Limit:</b>   | 0.0150   |       | <b>MRL:</b> 0.0150 |



## Method Blanks & Reporting Limits

**Batch:** B173378  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** Al

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173378-BLK1    | 0.064  | µg/L  |                   |
| B173378-BLK2    | 0.005  | µg/L  |                   |
| B173378-BLK3    | 0.028  | µg/L  |                   |
| B173378-BLK4    | 0.0002 | µg/L  |                   |
| <b>Average:</b> | 0.024  |       | <b>MDL:</b> 0.500 |
| <b>Limit:</b>   | 2.000  |       | <b>MRL:</b> 2.00  |

**Analyte:** As

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173378-BLK1    | 0.003  | µg/L  |                   |
| B173378-BLK2    | 0.004  | µg/L  |                   |
| B173378-BLK3    | 0.004  | µg/L  |                   |
| B173378-BLK4    | 0.005  | µg/L  |                   |
| <b>Average:</b> | 0.004  |       | <b>MDL:</b> 0.011 |
| <b>Limit:</b>   | 0.040  |       | <b>MRL:</b> 0.040 |

**Analyte:** Ca

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B173378-BLK1    | 0.044  | µg/L  |                  |
| B173378-BLK2    | 0.071  | µg/L  |                  |
| B173378-BLK3    | 0.184  | µg/L  |                  |
| B173378-BLK4    | -0.011 | µg/L  |                  |
| <b>Average:</b> | 0.072  |       | <b>MDL:</b> 4.60 |
| <b>Limit:</b>   | 13.800 |       | <b>MRL:</b> 13.8 |



## Method Blanks & Reporting Limits

### Analyte: Fe

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B173378-BLK1    | 0.02   | µg/L  |                  |
| B173378-BLK2    | 0.02   | µg/L  |                  |
| B173378-BLK3    | 0.02   | µg/L  |                  |
| B173378-BLK4    | 0.02   | µg/L  |                  |
| <b>Average:</b> | 0.02   |       | <b>MDL:</b> 0.40 |
| <b>Limit:</b>   | 4.00   |       | <b>MRL:</b> 4.00 |

### Analyte: K

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B173378-BLK1    | -0.2   | µg/L  |                  |
| B173378-BLK2    | -0.2   | µg/L  |                  |
| B173378-BLK3    | -0.2   | µg/L  |                  |
| B173378-BLK4    | -0.3   | µg/L  |                  |
| <b>Average:</b> | -0.2   |       | <b>MDL:</b> 2.4  |
| <b>Limit:</b>   | 10.0   |       | <b>MRL:</b> 10.0 |

### Analyte: Mg

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B173378-BLK1    | -0.02  | µg/L  |                  |
| B173378-BLK2    | -0.02  | µg/L  |                  |
| B173378-BLK3    | -0.004 | µg/L  |                  |
| B173378-BLK4    | -0.01  | µg/L  |                  |
| <b>Average:</b> | -0.01  |       | <b>MDL:</b> 0.54 |
| <b>Limit:</b>   | 1.70   |       | <b>MRL:</b> 1.70 |

### Analyte: Na

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B173378-BLK1    | -0.954 | µg/L  |                   |
| B173378-BLK2    | -0.999 | µg/L  |                   |
| B173378-BLK3    | -1.08  | µg/L  |                   |
| B173378-BLK4    | -1.10  | µg/L  |                   |
| <b>Average:</b> | -1.034 |       | <b>MDL:</b> 0.400 |
| <b>Limit:</b>   | 4.000  |       | <b>MRL:</b> 4.00  |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B173378-BLK1    | -2.02         | µg/L         |                  |
| B173378-BLK2    | -1.97         | µg/L         |                  |
| B173378-BLK3    | -2.07         | µg/L         |                  |
| B173378-BLK4    | -2.09         | µg/L         |                  |
| <b>Average:</b> | <b>-2.04</b>  |              | <b>MDL: 2.20</b> |
| <b>Limit:</b>   | <b>4.40</b>   |              | <b>MRL: 4.40</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-01 |                         | <b>Report Matrix:</b> Water      |            |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|---------------------------|-------------------------|----------------------------------|------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> EB-111517  |                         | <b>Sample Type:</b> Equip. Blank |            |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                | <b>Container</b>        | <b>Size</b>                      | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                         | Bottle FLPE Hg-T        | 125mL                            | 17-0222    | none                   | n/a          |                              | Cooler - 1746027   |
| B                         | Bottle HDPE ICP-ChelCol | 60mL                             | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C                         | Bottle HDPE ICP-W       | 125mL                            | 17-0213    | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |

| <b>Lab ID:</b> 1746027-02     |                         | <b>Report Matrix:</b> Water      |            |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|-------------------------------|-------------------------|----------------------------------|------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> EB-111517-(20) |                         | <b>Sample Type:</b> Equip. Blank |            |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                    | <b>Container</b>        | <b>Size</b>                      | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                             | Bottle FLPE Hg-T        | 125mL                            | 17-0222    | none                   | n/a          |                              | Cooler - 1746027   |
| B                             | Bottle HDPE ICP-ChelCol | 60mL                             | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C                             | Bottle HDPE ICP-W       | 125mL                            | 17-0213    | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |
| D                             | Vacutainer              | 6mL                              | 16-0257    | EDTA (PP)              |              |                              | Cooler - 1746027   |
| E                             | EXTRA_VOL               | 6mL                              | 16-0257    | EDTA (PP)              |              |                              | Cooler - 1746027   |

| <b>Lab ID:</b> 1746027-03              |                         | <b>Report Matrix:</b> Water |            |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|--|-------------------------|-----------------------------|------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-120+75-ST1-DS-111517 |                         | <b>Sample Type:</b> Sample  |            |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | Bottle FLPE Hg-T        | 125mL                       | 17-0222    | none                   | n/a          |                              | Cooler - 1746027   |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL                        | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C                                      | Bottle HDPE ICP-W       | 125mL                       | 17-0213    | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |

Project ID: PTC-OA1701  
PM: Jeremy Maute



BAL Report 1746027  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

| Lab ID: 1746027-04                   |                         |       | Report Matrix: Water |                        |         | Collected: 11/15/2017 |                  |
|--------------------------------------|-------------------------|-------|----------------------|------------------------|---------|-----------------------|------------------|
| Sample: PW-120+75-ST1-DS-111517-(20) |                         |       | Sample Type: Sample  |                        |         | Received: 11/16/2017  |                  |
| Des                                  | Container               | Size  | Lot                  | Preservation           | P-Lot   | pH                    | Ship. Cont.      |
| A                                    | Bottle FLPE Hg-T        | 125mL | 17-0222              | none                   | n/a     |                       | Cooler - 1746027 |
| B                                    | Bottle HDPE ICP-ChelCol | 60mL  | 17-0176              | 0.1% Optima HNO3 (BAL) | 1649047 | <2                    | Cooler - 1746027 |
| C                                    | Bottle HDPE ICP-W       | 125mL | 17-0213              | 0.2% HNO3 (BAL)        | 1736020 | <2                    | Cooler - 1746027 |
| D                                    | Vacutainer              | 6mL   | 16-0257              | EDTA (PP)              |         |                       | Cooler - 1746027 |
| E                                    | EXTRA_VOL               | 6mL   | 16-0257              | EDTA (PP)              |         |                       | Cooler - 1746027 |

| Lab ID: 1746027-05          |                         |       | Report Matrix: Water |                        |         | Collected: 11/15/2017 |                  |
|-----------------------------|-------------------------|-------|----------------------|------------------------|---------|-----------------------|------------------|
| Sample: PW-120+75-SW-111517 |                         |       | Sample Type: Sample  |                        |         | Received: 11/16/2017  |                  |
| Des                         | Container               | Size  | Lot                  | Preservation           | P-Lot   | pH                    | Ship. Cont.      |
| A                           | Bottle FLPE Hg-T        | 125mL | 17-0222              | none                   | n/a     |                       | Cooler - 1746027 |
| B                           | Bottle HDPE ICP-ChelCol | 60mL  | 17-0176              | 0.1% Optima HNO3 (BAL) | 1649047 | <2                    | Cooler - 1746027 |
| C                           | Bottle HDPE ICP-W       | 125mL | 17-0213              | 0.2% HNO3 (BAL)        | 1736020 | <2                    | Cooler - 1746027 |

Project ID: PTC-OA1701  
PM: Jeremy Maute



BAL Report 1746027  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

| Lab ID: 1746027-06<br>Sample: PW-120+75-SW-111517-(20) |                         |       | Report Matrix: Water<br>Sample Type: Sample |                        |         | Collected: 11/15/2017<br>Received: 11/16/2017 |                  |  |
|--|-------------------------|-------|---|------------------------|---------|---|------------------|--|
| Des  | Container               | Size  | Lot   | Preservation           | P-Lot   | pH  | Ship. Cont.      |  |
| A  | Bottle FLPE Hg-T        | 125mL | 17-0222                                     | none                   | n/a     |   | Cooler - 1746027 |  |
| B  | Bottle HDPE ICP-ChelCol | 60mL  | 17-0176                                     | 0.1% Optima HNO3 (BAL) | 1649047 | <2  | Cooler - 1746027 |  |
| C  | Bottle HDPE ICP-W       | 125mL | 17-0213                                     | 0.2% HNO3 (BAL)        | 1736020 | <2  | Cooler - 1746027 |  |
| D  | Vacutainer              | 6mL   | 16-0257                                     | EDTA (PP)              |         |   | Cooler - 1746027 |  |
| E  | EXTRA_VOL               | 6mL   | 16-0257                                     | EDTA (PP)              |         |   | Cooler - 1746027 |  |

| Lab ID: 1746027-07<br>Sample: PW-122+60-0-DS-111517 |                         |       | Report Matrix: Water<br>Sample Type: Sample |                        |         | Collected: 11/15/2017<br>Received: 11/16/2017 |                  |  |
|---|-------------------------|-------|---|------------------------|---------|---|------------------|--|
| Des   | Container               | Size  | Lot   | Preservation           | P-Lot   | pH  | Ship. Cont.      |  |
| A   | Bottle FLPE Hg-T        | 125mL | 17-0222                                     | none                   | n/a     |   | Cooler - 1746027 |  |
| B   | Bottle HDPE ICP-ChelCol | 60mL  | 17-0176                                     | 0.1% Optima HNO3 (BAL) | 1649047 | <2  | Cooler - 1746027 |  |
| C   | Bottle HDPE ICP-W       | 125mL | 17-0213                                     | 0.2% HNO3 (BAL)        | 1736020 | <2  | Cooler - 1746027 |  |

**Project ID:** PTC-OA1701  
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BAL Report 1746027  
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**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-08                 |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|---|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-122+60-0-DS-111517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                                | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A   | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B   | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C   | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |
| D   | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |
| E   | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |

| <b>Lab ID:</b> 1746027-09            |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|--------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-124+00-0-DS-111517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                    | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B                                    | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C                                    | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
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## Sample Containers

| <b>Lab ID:</b> 1746027-10                 |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|---|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-124+00-0-DS-111517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                                | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A   | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B   | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C   | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |
| D   | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |
| E   | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |

| <b>Lab ID:</b> 1746027-11              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-125+00-ST1-DS-111517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                      | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C                                      | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
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**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-12                   |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|---|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-125+00-ST1-DS-111517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                                  | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A   | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |
| B   | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C   | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |
| D   | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |
| E   | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |

| <b>Lab ID:</b> 1746027-13          |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-125+00-SW-111517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                         | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                  | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |
| B                                  | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C                                  | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-14               |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|---|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-125+00-SW-111517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                              | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                       | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |
| B                                       | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C                                       | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |
| D                                       | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |
| E                                       | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |

| <b>Lab ID:</b> 1746027-15            |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|--------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-125+50-0-DS-111517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |
| B                                    | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C                                    | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-16                 |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|---|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-125+50-0-DS-111517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                                | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A   | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B   | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C   | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |
| D   | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |
| E   | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |

| <b>Lab ID:</b> 1746027-17            |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|--------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-126+90-0-DS-111517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                    | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B                                    | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C                                    | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
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**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-18                 |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|---|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-126+90-0-DS-111517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                                | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A   | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B   | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C   | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |
| D   | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |
| E   | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |

| <b>Lab ID:</b> 1746027-19            |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|--------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-128+30-0-DS-111517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                           | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                    | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B                                    | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C                                    | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-20                 |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|---|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-128+30-0-DS-111517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                                | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A   | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B   | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C   | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |
| D   | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |
| E   | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |  |

| <b>Lab ID:</b> 1746027-21              |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |  |
|--|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|--|
| <b>Sample:</b> PW-128+50-ST1-DS-111517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |  |
| <b>Des</b>                             | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |  |
| A                                      | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |  |
| B                                      | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |  |
| C                                      | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-22                   |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|---|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-128+50-ST1-DS-111517-(20) |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                                  | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A   | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |
| B   | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C   | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |
| D   | Vacutainer              | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |
| E   | EXTRA_VOL               | 6mL         | 16-0257                     | EDTA (PP)              |              |                              | Cooler - 1746027   |

| <b>Lab ID:</b> 1746027-23          |                         |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|------------------------------------|-------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-128+50-SW-111517 |                         |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                         | <b>Container</b>        | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                  | Bottle FLPE Hg-T        | 125mL       | 17-0222                     | none                   | n/a          |                              | Cooler - 1746027   |
| B                                  | Bottle HDPE ICP-ChelCol | 60mL        | 17-0176                     | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C                                  | Bottle HDPE ICP-W       | 125mL       | 17-0213                     | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1746027  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1746027-24               |                         | <b>Report Matrix:</b> Water |            |                        |              | <b>Collected:</b> 11/15/2017 |                    |
|---|-------------------------|-----------------------------|------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-128+50-SW-111517-(20) |                         | <b>Sample Type:</b> Sample  |            |                        |              | <b>Received:</b> 11/16/2017  |                    |
| <b>Des</b>                              | <b>Container</b>        | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                       | Bottle FLPE Hg-T        | 125mL                       | 17-0222    | none                   | n/a          |                              | Cooler - 1746027   |
| B                                       | Bottle HDPE ICP-ChelCol | 60mL                        | 17-0176    | 0.1% Optima HNO3 (BAL) | 1649047      | <2                           | Cooler - 1746027   |
| C                                       | Bottle HDPE ICP-W       | 125mL                       | 17-0213    | 0.2% HNO3 (BAL)        | 1736020      | <2                           | Cooler - 1746027   |
| D                                       | Vacutainer              | 6mL                         | 16-0257    | EDTA (PP)              |              |                              | Cooler - 1746027   |
| E                                       | EXTRA_VOL               | 6mL                         | 16-0257    | EDTA (PP)              |              |                              | Cooler - 1746027   |

## Shipping Containers

### Cooler - 1746027

**Received:** November 16, 2017 9:10  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 3.1 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

For BAL use only  
 Received by: [Signature] Date: 11/16/17  
 Work Order ID: \_\_\_\_\_ Time: 9:10  
 Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection                              |                       | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  |                                      | Comments |  |      |
|--|---|-----------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|--------------------------------------|----------|--|------|
|  | Date                                    | Time                  | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 | Note: Field conductivity measurement |          |  |      |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |                                      |          |  |      |
| Sample ID  | Specify Here                            |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |                                      |          |  |      |
| 1  | EB-111517                               | 11-15-17              | 845                | water                | 3               | Z                         | Z  |   |   |   | X   |   |  |                                      |          |  |      |
| 2  | EB-111517-(20)                          |                       | 845                |                      | 5               | Y                         |  |   |   |   |   | X   | X  | X                                    |          |  |      |
| 3  | PW-120+75-STI-DS-111517                 |                       | 1005               |                      | 5               | Z                         |  |   |   |   | X   |   |  |                                      |          |  | 36MS |
| 4  | PW-120+75-STI-DS-111517-(20)            |                       | 1005               |                      | 5               | Y                         |  |   |   |   | X   | X   | X  |                                      |          |  | 36MS |
| 5  | PW-120+75-STI-SW-111517                 |                       | 1030               |                      | 3               | Z                         |  |   |   |   | X   |   |  |                                      |          |  | 35MS |
| 6  | PW-120+75-SW-111517-(20)                |                       | 1030               |                      | 5               | Y                         |  |   |   |   |   | X   | X  | X                                    |          |  | 35MS |
| 7  | PW-122+60-0-DS-111517                   |                       | 1105               |                      | 3               | Z                         |  |   |   |   | X   |   |  |                                      |          |  | 29MS |
| 8  | PW-122+60-0-DS-111517-(20)              |                       | 1105               |                      | 5               | Y                         |  |   |   |   |   | X   | X  | X                                    |          |  | 29MS |
| 9  | PW-124+00-0-DS-111517                   |                       | 1200               |                      | 3               | Z                         |  |   |   |   | X   |   |  |                                      |          |  | 32MS |
| 10   | PW-124+00-0-DS-111517-(20)              |                       | 1200               |                      | 5               | Y                         |  |   |   |   |   | X   | X  | X                                    |          |  | 32MS |
| Trip Blank (specify)   |   |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |                                      |          |  |      |
| Relinquished By: <u>[Signature]</u>  |   | Date: <u>11/16/17</u> |                    | Time: <u>9:05</u>    |                 | Relinquished By:          |  | Date:   |   | Time:   |   |   |  |                                      |          |  |      |
| Received By:   |   | Date:                 |                    | Time:                |                 | Total Number of Packages: |  |   |   |   |   |   |  |                                      |          |  |      |

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# Chain-of-Custody Form

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

For BAL use only  
 Received by: [Signature] Date: 11/16/17  
 Work Order ID: \_\_\_\_\_ Time: 9:10  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection                              |                       | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|-----------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time                  | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Sample ID  | Specify Here                            |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 1  | PW-125+00-ST1-DS-111517                 | 11-15-17              | 1230               | water                | 3               | Z                         | Z  |   |   |   | X   |   |  |          | 36MS                                 |
| 2  | PW-125+00-ST1-DS-111517-(20)            |                       | 1230               |                      | 5               | Y                         |  |   |   |   | X   | X   | X  | X        | 36MS                                 |
| 3  | PW-125+00-SW-111517                     |                       | 1300               |                      | 3               | Z                         |  |   |   |   | X   |   |  |          | 36MS                                 |
| 4  | PW-125+00-SW-111517-(20)                |                       | 1300               |                      | 5               | Y                         |  |   |   |   | X   | X   | X  | X        | 36MS                                 |
| 5  | PW-125+50-0-DS-111517                   |                       | 1320               |                      | 3               | Z                         |  |   |   |   | X   |   |  |          | 33MS                                 |
| 6  | PW-125+50-0-DS-111517-(20)              |                       | 1320               |                      | 5               | Y                         |  |   |   |   | X   | X   | Y  | Y        | 33MS                                 |
| 7  | PW-126+90-0-DS-111517                   |                       | 1345               |                      | 3               | Z                         |  |   |   |   | X   |   |  |          | 34MS                                 |
| 8  | PW-126+90-0-DS-111517-(20)              |                       | 1345               |                      | 5               | Y                         |  |   |   |   | X   | Y   | X  | X        | 34MS                                 |
| 9  | PW-128+30-0-DS-111517                   |                       | 1410               |                      | 3               | Z                         |  |   |   |   | Y   |   |  |          | 32MS                                 |
| 10   | PW-128+30-0-DS-111517-(20)              |                       | 1410               |                      | 5               | Y                         |  |   |   |   | X   | X   | Y  | Y        | 32MS                                 |
| Trip Blank (specify)   |   |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>[Signature]</u>  |   | Date: <u>11/16/17</u> |                    | Time: <u>9:05</u>    |                 | Relinquished By:          |  |   | Date:   |   | Time:   |   |  |          |                                      |
| Received By:   |   | Date:                 |                    | Time:                |                 | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |

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**BROOKS  
APPLIED  
LABS**

# Chain-of-Custody Form

BAL Report 1746027

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

For BAL use only  
 Received by: [Signature] Date: 11/16/17  
 Work Order ID: \_\_\_\_\_ Time: 9:10  
 Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection                   |                       | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |
|---|------------------------------|-----------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|
|   | Date                         | Time                  | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Specify Here                 |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| Sample ID   |                              |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| 1   | PW-128+50-STI-DS-111517      | 11-15-17 1430         | water              | 3                    | Y               | U                         |  |   |   | X   |   |   |  | 36MS     |
| 2   | PW-128+50-STI-DS-111517-(20) | ↓ 1430                | ↓                  | 5                    | Y               | ↓                         |  |   |   |   | X   | X   | X  | 36MS     |
| 3   | PW-128+50-SW-111517          | ↓ 1445                | ↓                  | 3                    | Y               | ↓                         |  |   | X   |   |   |   |  | 37MS     |
| 4   | PW-128+50-SW-111517-(20)     | ↓ 1445                | ↓                  | 5                    | Y               | ↓                         |  |   |   |   | X   | X   | X  | 37MS     |
| 5   |                              |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| 6   |                              |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| 7   |                              |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| 8   |                              |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| 9   |                              |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| 10  |                              |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| Trip Blank (specify)  |                              |                       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |
| Relinquished By: <u>[Signature]</u>   |                              | Date: <u>11/16/17</u> |                    | Time: <u>9:05</u>    |                 | Relinquished By:          |  |   |   | Date:   |   | Time:   |  |          |
| Received By:  |                              | Date:                 |                    | Time:                |                 | Total Number of Packages: |  |   |   |   |   |   |  |          |

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**Data Gap #2ABC**  
**2018 Water Samples (BAL)**

## QA/QC SOLUTIONS, LLC



James J. Mc Ateer, Jr., Managing Member  
7532 Champion Hill Rd. SE  
Salem, Oregon 97306  
Telephone: 503.763.6948  
Facsimile: 503.566.2114  
Cellular: 503.881.1501  
email: jjmcateer@msn.com

December 21, 2018

Troy Bussey Jr., P.E.  
PIONEER Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, Washington 98503

Subject: Feasibility Study Data Gap Investigation, Former Arkema Manufacturing Site, Tacoma, WA;  
Brooks Applied Labs 2018 Water Sample Data Validation Review Summary  
Client Project No.: Not Specified  
QA/QC Solutions, LLC Project No.: 091018.1

Dear Troy:

This letter documents the results of the data validation review of the metals (elements) analyses completed on groundwater (GW) and pore water (PW) samples collected in September and October 2018. The data is associated with Feasibility Study Data Gap Investigation completed at the Former Arkema Manufacturing Site located in Tacoma, Washington. Details of the investigation completed are provided in the Feasibility Study Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. (Pioneer 2017).

The data reported were validated to verify the laboratory quality assurance and quality control (QA/QC) procedures were documented and that the overall quality of the data reported is sufficient to support its intended purposes. A summary of the overall assessment of data quality, the data set, a summary of the analytical methods used to complete the chemical analyses, a summary of the data validation procedures used, and a summary of the reasons why data were qualified (including other items noted during data validation) is presented below.

### Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratory during the analysis of the samples were generally acceptable. Selected sample results required qualification during data validation because method-specific QA/QC criteria were not met; results may be qualified for more than one reason. During data validation, the following actions were taken:

- A total of 34 results reported as detected were qualified as estimated (assigned a *J* qualifier).
- No results required restatement as undetected (*U* or *UJ*) or rejection (*R*).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data). Analytical data that were reported as undetected (*U*) by the laboratory are usable.

## Data Set

A total 31 groundwater samples and 27 pore water samples (collected using two different sampling methods were collected. The sample counts include natural, field duplicate, and equipment rinsate blank samples). All water samples were field filtered (0.45 µm) and were collected in September and October 2018. A summary of the samples collected and the analyses completed is presented in Table 1.

Analyses were completed by Brooks Applied Labs located in Bothell, Washington. A total of 3 work orders summarizing the results of the samples and associated quality control data.

## Analytical Methods

The analytical methods that were used to complete the chemical analyses included the following:

- Dissolved arsenic was determined using U.S. EPA Method 1638 (modified) (U.S. EPA 1999). The original sample bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). Sample analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85 °C. Quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS).
- USEPA 1640 Mod (column chelation) for dissolved copper, nickel and lead were determined using U.S. EPA Method 1640 (modified) (U.S. EPA 1997). Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid (HNO<sub>3</sub>) and then prepared according to the analytical method. All sample fractions for total recoverable and dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85 °C. Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS).
- Dissolved mercury by U.S. EPA 1631E (U.S. EPA 2002a). Samples were oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

## Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results that were reported by the laboratory; this level of validation is also referred to as an abbreviated data review (equivalent to "Stage 2B" review per U.S. EPA 2009, which is equivalent to "Level EPA2B" for use with the Washington Department of Ecology EIMS database). The analytical data were validated generally following the applicable guidance and requirements:

- *Guidance on Environmental Data Verification and Validation* (U.S. EPA 2002b)
- *USEPA Contract Laboratory Program, National Functional Guidelines for Superfund Organic Methods Data Review*. Final. OSWER 9240.1-45. USEPA/540/R-08/01 (U.S. EPA 2008).
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review*. Final. OSWER 9240.1-51. EPA 540-R-10-011 (U.S. EPA 2010).

- Method-specific and laboratory-established quality control requirements, as applicable.
- The quality control limits summarized in the *Feasibility Study Data Gap Investigation Work Plan, Former Arkema Manufacturing Site*. (Pioneer 2017).

Data validation procedures were mostly modified to accommodate QA/QC requirements for methods that are not specifically addressed by the USEPA functional guidelines. In this situation, method-specific, laboratory-established, project-specific control limits were used, as necessary, to determine if qualification of the data was necessary. The laboratory data deliverables that were validated, if present, included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Sample preparation logs or laboratory summary result forms to verify analytical holding times were met.
- Results for applicable method blanks and field blanks to determine whether an analyte that was reported as detected in any sample was the result of possible contamination introduced at the laboratory or during field sampling, respectively.
- Results for applicable standard reference material (SRM), laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, matrix spike (MS), and/or matrix spike duplicate (MSD) recoveries to assess analytical accuracy
- Results for applicable laboratory duplicate sample, duplicate LCS, and/or MSD analyses to assess analytical precision.
- Results for the field duplicate samples to provide additional information in support of the quality assurance review.
- Laboratory summaries of analytical results.

Verification of 100-percent of all applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets was not completed during the data validation review. There may be analytical problems that could only be identified by reviewing every instrument printouts and associated analytical quality control results. Confirmation of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narratives did not indicate any significant problems with data that were not reviewed during data validation. The adequacy of the sampling procedures was not completed during the data validation.

Performance based control limits established by the laboratory and applicable control limits specified in the analytical methods were used to evaluate data quality and to determine if specific data required qualification. Data qualifiers were assigned following guidance specified by U.S. EPA (2002b, 2009, and 2010) and the quality control requirements specified in the applicable analytical methods.

## Reasons for Data Qualification

The reasons for data qualification and a summary of the qualified data are summarized in Table 2 and included the following:

- A total of 34 results reported as detected at a concentration above the method detection limit (MDL), but less than the reporting limit (RL) were qualified as estimated (*J*).

- One result reported as detected was qualified as estimated (*J*) because the MS recovery did not meet applicable control limits.
- One result reported as detected was qualified as estimated (*J*) because the MSD recovery and relative percent difference (RPD) between the MS and MSD recoveries did not meet applicable control limits.
- One result reported as detected was qualified as estimated (*J*) because the laboratory noted the sample arrived in an HDPE bottle rather than the required FLPE container

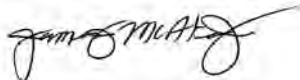
### General Comments

There were some quality control items identified during data validation and/or noted by the laboratory in the case narratives and are not discussed herein. However, qualification of the sample results was not required in these instances.

Data users should read the laboratory case narratives for additional details. Data users should note, however, the elements reported as detected in the equipment rinsate blank FB-PPS-091318-(20) (see BAL Report No. 1837065 are considered as anonymously high compared to the results reported in the associated samples and to all other equipment rinsate blanks. No explanation can be made as this time to determine the results reported for this equipment rinsate blank. No sample results were qualified based on these results and data users should consider this equipment rinsate blank as an outlier.

This concludes the data validation review summary. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at [jjmcateer@msn.com](mailto:jjmcateer@msn.com).

Cordially,



*QA/QC Solutions, LLC*  
James J. Mc Ateer, Jr., Managing Member

Attachments

## References

Pioneer 2017. FS Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. February 2017. Prepared for Port of Tacoma. Prepared by Pioneer Technologies Corporation.

U.S. EPA 1996. Method 1638: Determination of Trace Elements in Ambient Waters by Inductively Coupled Plasma — Mass Spectrometry. January 1996. U.S. Environmental Protection Agency Office of Water<sup>[L]</sup><sub>[SEP]</sub> Engineering and Analysis Division (4303), Washington, D.C.

U.S. EPA 1997. Method 1640: Determination of Trace Elements in Water by Preconcentration and Inductively Coupled Plasma-Mass Spectrometry. April 1997. U.S. Environmental Protection Agency Office of Water<sup>[L]</sup><sub>[SEP]</sub> Engineering and Analysis Division (4303), Washington, D.C.

U.S. EPA 2002a. Method 1631, Revision E: <sup>[L]</sup><sub>[SEP]</sub>Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry. EPA-821-R-02-019. August 2002. U.S. Environmental Protection Agency, Office of Water (4303), Washington, DC.

U.S. EPA 2002b. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002. U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC.

U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA 2010. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OSWER 9240.1-51. EPA 540-R-10-011. January 2010. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC.

**Table 1. Summary of Samples Collected and Analyses Completed**

| <b>Sample Number</b>                 | <b>Laboratory Sample Number</b> | <b>Sample Date</b> | <b>Dissolved Arsenic by 1638 Modified</b> | <b>Dissolved Copper, Nickel, and Lead by 1640 Modified</b> | <b>Dissolved Mercury by 16311E</b> |
|--------------------------------------|---------------------------------|--------------------|---|--|------------------------------------|
| <b><u>BAL Report No. 1837065</u></b> |                                 |                    |   |  |                                    |
| PW-119+25-ST1-091118-(20)            | 1837065-01                      | 09/11/18           | ✓   | ✓  | ✓                                  |
| PW-120+75-ST1-091118-(20)            | 1837065-02                      | 09/11/18           | ✓   | ✓  | ✓                                  |
| PW-123+25-ST1-091218-(20)            | 1837065-03                      | 09/12/18           | ✓   | ✓  | ✓                                  |
| PW-125+00-ST1-091218-(20)            | 1837065-04                      | 09/12/18           | ✓   | ✓  | ✓                                  |
| PW-126+80-ST1-091218-(20)            | 1837065-05                      | 09/12/18           | ✓   | ✓  | ✓                                  |
| PW-128+50-ST1-091318-(20)            | 1837065-06                      | 09/13/18           | ✓   | ✓  | ✓                                  |
| PW-128+50-ST1-091318-(21)            | 1837065-07                      | 09/13/18           | ✓   | ✓  | ✓                                  |
| PW-130+75-ST1-091318-(20)            | 1837065-08                      | 09/13/18           | ✓   | ✓  | ✓                                  |
| FB-PPS-091318-(20)                   | 1837065-09                      | 09/13/18           | ✓   | ✓  | ✓                                  |
| <b><u>BAL Report No. 1841055</u></b> |                                 |                    |   |  |                                    |
| GW-131+00-1-100818-(20)              | 1841055-01                      | 10/08/18           | ✓   | ✓  | ✓                                  |
| GW-131+00-2-100818-(20)              | 1841055-02                      | 10/08/18           | ✓   | ✓  | ✓                                  |
| GW-129+65-1-100818-(20)              | 1841055-03                      | 10/08/18           | ✓   | ✓  | ✓                                  |
| GW-129+65-2-100818-(20)              | 1841055-04                      | 10/08/18           | ✓   | ✓  | ✓                                  |
| GW-128+30-1-100818-(20)              | 1841055-05                      | 10/08/18           | ✓   | ✓  | ✓                                  |
| GW-128+30-2-100818-(20)              | 1841055-06                      | 10/08/18           | ✓   | ✓  | ✓                                  |
| GW-126+90-2-100818-(20)              | 1841055-07                      | 10/08/18           | ✓   | ✓  | ✓                                  |
| GW-6E3-2-100918-(20)                 | 1841055-08                      | 10/09/18           | ✓   | ✓  | ✓                                  |
| GW-128+30-0-100918-(20)              | 1841055-09                      | 10/09/18           | ✓   | ✓  | ✓                                  |
| GW-129+65-0-100918-(20)              | 1841055-10                      | 10/09/18           | ✓   | ✓  | ✓                                  |
| GW-126+90-0-101018-(20)              | 1841055-11                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-125+50-0-101018-(20)              | 1841055-12                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-126+90-1-101018-(20)              | 1841055-13                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-125+50-1-101018-(20)              | 1841055-14                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-125+50-2-101018-(20)              | 1841055-15                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-122+60-0-101018-(20)              | 1841055-16                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-124+00-0-101018-(20)              | 1841055-17                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-124+00-1-101018-(20)              | 1841055-18                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-124+00-2-101018-(20)              | 1841055-19                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-122+60-1-101018-(20)              | 1841055-20                      | 10/10/18           | ✓   | ✓  | ✓                                  |
| GW-124+00-0-101118-(20)              | 1841055-21                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-125+50-0-101118-(20)              | 1841055-22                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-126+90-0-101118-(20)              | 1841055-23                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-122+60-2-101118-(20)              | 1841055-24                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-5B1-1R-101118-(20)                | 1841055-25                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-5B1-1R-101118-(21)                | 1841055-26                      | 10/11/18           | ✓   | ✓  | ✓                                  |

**Table 1. Summary of Samples Collected and Analyses Completed**

| <b>Sample Number</b>                 | <b>Laboratory Sample Number</b> | <b>Sample Date</b> | <b>Dissolved Arsenic by 1638 Modified</b> | <b>Dissolved Copper, Nickel, and Lead by 1640 Modified</b> | <b>Dissolved Mercury by 16311E</b> |
|--------------------------------------|---------------------------------|--------------------|---|--|------------------------------------|
| GW-121+80-1-101118-(20)              | 1841055-27                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-121+80-2-101118-(20)              | 1841055-28                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-5B1-2R-101118-(20)                | 1841055-29                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-120+75-2-101118-(20)              | 1841055-30                      | 10/11/18           | ✓   | ✓  | ✓                                  |
| GW-EB-EB-101218-(20)                 | 1841055-31                      | 10/12/18           | ✓   | ✓  | ✓                                  |
| <b><u>BAL Report No. 1842044</u></b> |                                 |                    |   |  |                                    |
| PW-119+25-0-DS-101718-(20)           | 1842044-01                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-119+25-ST1-DS-101718-(20)         | 1842044-02                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-120+75-0-DS-101718-(20)           | 1842044-03                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-120+75-ST1-DS-101718-(20)         | 1842044-04                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-122+60-0-DS-101718-(20)           | 1842044-05                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-123+25-ST1-DS-101718-(20)         | 1842044-06                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-123+25-ST1-DS-101718-(21)         | 1842044-07                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-124+00-0-DS-101718-(20)           | 1842044-08                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| SW-128+50-SW-DS-101718-(20)          | 1842044-09                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| SW-120+75-SW-DS-101718-(20)          | 1842044-10                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-125+00-ST1-DS-101718-(20)         | 1842044-11                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| SW-125+00-SW-DS-101718-(20)          | 1842044-12                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-125+50-0-DS-101718-(20)           | 1842044-13                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-126+80-ST1-DS-101718-(20)         | 1842044-14                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-126+90-0-DS-101718-(20)           | 1842044-15                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-128+30-0-DS-101718-(20)           | 1842044-16                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| PW-128+50-ST1-DS-101718-(20)         | 1842044-17                      | 10/17/18           | ✓   | ✓  | ✓                                  |
| EB-EB-101718-(20)                    | 1842044-18                      | 10/17/18           | ✓   | ✓  | ✓                                  |



**Table 2. Summary of Qualified Data**

| Sample Number*                | Laboratory Sample Number | Chemical | Concentration | Units | MDL    | RL     | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result  | Possible Bias <sup>b,c,d</sup> |
|-------------------------------|--------------------------|----------|---------------|-------|--------|--------|----------------------|---------------------------|--|---|--------------------------------|
|                               |                          |          |               |       |        |        |                      |                           |  |   |                                |
| <b>BAL Report No. 1837065</b> |                          |          |               |       |        |        |                      |                           |  |   |                                |
| PW-119+25-ST1-091118-(20)     | 1837065-01               | Mercury  | 0.17          | ng/l  | 0.13   | 0.40   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| PW-120+75-ST1-091118-(20)     | 1837065-02               | Mercury  | 0.14          | ng/l  | 0.13   | 0.40   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| PW-123+25-ST1-091218-(20)     | 1837065-03               | Lead     | 0.0058        | ug/l  | 0.0051 | 0.0152 | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
|                               |                          | Mercury  | 0.21          | ng/l  | 0.13   | 0.40   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| PW-126+80-ST1-091218-(20)     | 1837065-05               | Lead     | 0.0120        | ug/l  | 0.0051 | 0.0152 | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
|                               |                          | Mercury  | 0.40          | ng/l  | 0.13   | 0.40   | H, J                 | J                         | Concentration is >MDL, <RL and laboratory noted sample arrived in an HDPE bottle rather than the required FLPE | NA  | Low or high                    |
| PW-128+50-ST1-091318-(20)     | 1837065-06               | Lead     | 0.0052        | ug/l  | 0.0051 | 0.0152 | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
|                               |                          | Copper   | 0.0423        | ug/l  | 0.0152 | 0.0455 | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| PW-128+50-ST1-091318-(21)     | 1837065-07               | Lead     | 0.0060        | ug/l  | 0.0051 | 0.0152 | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
|                               |                          | Copper   | 0.0356        | ug/l  | 0.0152 | 0.0455 | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| PW-130+75-ST1-091318-(20)     | 1837065-08               | Mercury  | 0.16          | ng/l  | 0.13   | 0.40   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| FB-PPS-091318-(20)            | 1837065-09               | Mercury  | 0.19          | ng/l  | 0.13   | 0.40   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| <b>BAL Report No. 1841055</b> |                          |          |               |       |        |        |                      |                           |  |   |                                |
| GW-131+00-1-100818-(20)       | 1841055-01               | Arsenic  | 0.520         | ug/l  | 0.490  | 1.63   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-131+00-2-100818-(20)       | 1841055-02               | Mercury  | 0.25          | ng/l  | 0.14   | 0.42   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-128+30-1-100818-(20)       | 1841055-05               | Mercury  | 0.27          | ng/l  | 0.14   | 0.42   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-128+30-2-100818-(20)       | 1841055-06               | Nickel   | 1.54          | ug/l  | 0.707  | 3.03   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-6E3-2-100918-(20)          | 1841055-08               | Mercury  | 0.27          | ng/l  | 0.14   | 0.42   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-125+50-2-101018-(20)       | 1841055-15               | Nickel   | 0.906         | ug/l  | 0.707  | 3.03   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-124+00-2-101018-(20)       | 1841055-19RE1            | Copper   | 0.380         | ug/l  | 0.152  | 0.455  | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-124+00-0-101118-(20)       | 1841055-21               | Mercury  | 0.36          | ng/l  | 0.14   | 0.42   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-122+60-2-101118-(20)       | 1841055-24               | Mercury  | 0.40          | ng/l  | 0.14   | 0.42   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-5B1-1R-101118-(20)         | 1841055-25               | Nickel   | 2.90          | ug/l  | 0.707  | 3.03   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
|                               | 1841055-25RE1            | Lead     | 0.0739        | ug/l  | 0.0505 | 0.152  | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-5B1-2R-101118-(20)         | 1841055-29RE1            | Arsenic  | 0.884         | ug/l  | 0.490  | 1.63   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| GW-120+75-2-101118-(20)       | 1841055-30               | Mercury  | 0.29          | ng/l  | 0.13   | 0.41   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| <b>BAL Report No. 1842044</b> |                          |          |               |       |        |        |                      |                           |  |   |                                |
| PW-119+25-ST1-DS-101718-(20)  | 1842044-02               | Lead     | 0.0134        | ug/l  | 0.0051 | 0.0152 | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| PW-120+75-0-DS-101718-(20)    | 1842044-03               | Mercury  | 0.17          | ng/l  | 0.13   | 0.41   | J                    | J                         | Concentration is >MDL, <RL   | NA  | Low or high                    |
| PW-122+60-0-DS-101718-(20)    | 1842044-05               | Mercury  | 0.71          | ng/l  | 0.13   | 0.41   | M, N                 | J                         | Concentration is >MDL, <RL, MSD recovery above upper control limit, and RPD above control limit                | NA, MS recovery at 132 percent, and RPD for MS/MSD sat 27 percent | Low or high                    |

**Table 2, continued**

| Sample Number*               | Laboratory<br>Sample Number | Chemical | Concentration | Units | MDL    | RL     | Laboratory<br>Data Flag | Data<br>Validation<br>Qualifier | Quality Control Reason   | Quality Control Result            | Possible<br>Bias <sup>b,c,d</sup> |
|------------------------------|-----------------------------|----------|---------------|-------|--------|--------|-------------------------|---------------------------------|--|-----------------------------------|-----------------------------------|
|                              |                             |          |               |       |        |        |                         |                                 |  |                                   |                                   |
| PW-123+25-ST1-DS-101718-(20) | 1842044-06                  | Lead     | 0.0114        | ug/l  | 0.0051 | 0.0152 | J                       | J                               | Concentration is >MDL, <RL   | NA                                | Low or high                       |
| PW-123+25-ST1-DS-101718-(21) | 1842044-07                  | Lead     | 0.0110        | ug/l  | 0.0051 | 0.0152 | J                       | J                               | Concentration is >MDL, <RL   | NA                                | Low or high                       |
|                              |                             | Mercury  | 0.22          | ng/l  | 0.13   | 0.41   | J                       | J                               | Concentration is >MDL, <RL   | NA                                | Low or high                       |
| PW-124+00-0-DS-101718-(20)   | 1842044-08                  | Mercury  | 0.36          | ng/l  | 0.13   | 0.41   | J                       | J                               | Concentration is >MDL, <RL   | NA                                | Low or high                       |
| PW-128+50-ST1-DS-101718-(20) | 1842044-17                  | Lead     | 0.0095        | ug/l  | 0.0051 | 0.0152 | J                       | J                               | Concentration is >MDL, <RL   | NA                                | Low or high                       |
|                              |                             | Mercury  | 0.15          | ng/l  | 0.13   | 0.41   | J                       | J                               | Concentration is >MDL, <RL   | NA                                | Low or high                       |
|                              |                             | Nickel   | 0.363         | ug/l  | 0.0071 | 0.0303 | N, X                    | J                               | Concentration is >MDL, <RL and MS recovery above upper control limit | NA and MS recovery at 129 percent | Low or high                       |

**Notes:**

- (20) - samples are dissolved fractions
- (21) - samples are field duplicate dissolved fractions
- EB or FB - samples are equipment rinsate blanks
- H - container type incorrect
- HDPE - high density polyethylene
- FLPE - fluorinated polyethylene
- J - estimated
- LCS - laboratory control sample
- M - laboratory duplicate precision (RPD) no within acceptance limit MDL - method detection limit
- MS - matrix spike
- MS - matrix spike duplicate
- N - spike recovery not within acceptance criteria
- R - rejected
- RE1: reanalysis
- RL - reporting limit
- RPD - relative percent differences
- U - undetected at detection limit shown
- X - method blank outlier, result may exhibit a positive bias

|                                |    |
|--------------------------------|----|
| Total results qualified "J" =  | 34 |
| Total results qualified "U" =  | 0  |
| Total results qualified "UJ" = | 0  |
| Total results qualified "R" =  | 0  |

<sup>a</sup> Summary of qualified data is for natural and field quality control samples only

<sup>b</sup>Low bias - concentration reported is exhibits low bias and the actual reporting limit or concentration may be greater than reported

<sup>c</sup>High bias - result reported exhibits high bias and the actual reporting limit or concentration may be lower than reported

<sup>d</sup>False positive - compound is likely not present



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

October 15, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On September 14, 2018, Brooks Applied Labs (BAL) received nine (9) water samples in a sealed container with a temperature of 4.5°C. The samples were logged-in for dissolved arsenic [As] analyses via digestion and subsequent analysis by modified EPA Method 1638. The samples were logged in for dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. The samples were logged-in for the dissolved mercury [Hg] analysis by EPA Method 1631E, according to the chain-of-custody (COC) form.

The samples submitted for dissolved analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives was monitored for contamination to account for any biases associated with the sample results.

*Dissolved Metals (As) Analysis by EPA Method 1638, Mod.*

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Dissolved arsenic quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

**Batch B182470**

Arsenic results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these

results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

Dissolved metals (Cu, Ni, and Pb) Analysis by EPA Method 1640, Mod.

Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid (HNO<sub>3</sub>) and then prepared according to EPA Method 1640. All sample fractions for dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). The ICP-DRC-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

**Batch B182471**

The dissolved lead result for the field blank sample, identified as **FB-PPS-091318-(20)** (1837065-09), is greater than the associated MRL. Method blanks and bracketing CCBs were clean for lead and re-analyses confirmed the elevated result. The container label was inspected and there was no evidence of mis-labeling for sample 1837065-09. Consequently, the lead result for 1837065-09 is deemed representative of the supplied sample and lead results were reported from this batch.

Dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

Dissolved Mercury Quantitation by EPA Method 1631E

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride (SnCl<sub>2</sub>) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

**Batch B182462**

The dissolved mercury fraction for the sample identified as **PW-126+80-ST1-091218-(20)** (1837065-05) arrived in an HDPE container. The method (EPA 1631E) requires samples to be collected in glass or FLPE containers. Upon receipt, the mercury fraction for **PW-126+80-ST1-091218-(20)** (1837065-05) was transferred into an FLPE container. The mercury result for **PW-126+80-ST1-091218-(20)** (1837065-05) should be considered estimated and has been qualified "H" due to a sample collection (i.e. container type) violation.

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

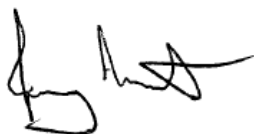
In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these

results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksapplied.com



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Please see narrative for explanation.                                      |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.                               |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Please see narrative for explanation.  |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                    | Lab ID     | Report Matrix | Type        | Sampled    | Received   |
|---------------------------|------------|---------------|-------------|------------|------------|
| PW-119+25-ST1-091118-(20) | 1837065-01 | Water         | Sample      | 09/11/2018 | 09/14/2018 |
| PW-120+75-ST1-091118-(20) | 1837065-02 | Water         | Sample      | 09/11/2018 | 09/14/2018 |
| PW-123+25-ST1-091218-(20) | 1837065-03 | Water         | Sample      | 09/12/2018 | 09/14/2018 |
| PW-125+00-ST1-091218-(20) | 1837065-04 | Water         | Sample      | 09/12/2018 | 09/14/2018 |
| PW-126+80-ST1-091218-(20) | 1837065-05 | Water         | Sample      | 09/12/2018 | 09/14/2018 |
| PW-128+50-ST1-091318-(20) | 1837065-06 | Water         | Sample      | 09/13/2018 | 09/14/2018 |
| PW-128+50-ST1-091318-(21) | 1837065-07 | Water         | Sample      | 09/13/2018 | 09/14/2018 |
| PW-130+75-ST1-091318-(20) | 1837065-08 | Water         | Sample      | 09/13/2018 | 09/14/2018 |
| FB-PPS-091318-(20)        | 1837065-09 | Water         | Field Blank | 09/13/2018 | 09/14/2018 |

## Batch Summary

| Analyte | Lab Matrix | Method          | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|-----------------|------------|------------|---------|----------|
| As      | Water      | EPA 1638 Mod    | 09/18/2018 | 09/23/2018 | B182470 | 1801289  |
| Cu      | Water      | EPA 1640 Column | 09/25/2018 | 09/28/2018 | B182471 | 1801318  |
| Hg      | Water      | EPA 1631 E      | 09/20/2018 | 09/20/2018 | B182462 | 1801273  |
| Ni      | Water      | EPA 1640 Column | 09/25/2018 | 09/28/2018 | B182471 | 1801318  |
| Pb      | Water      | EPA 1640 Column | 09/25/2018 | 09/28/2018 | B182471 | 1801318  |



## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL    | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|----------|-----------|--------|--------|------|---------|----------|
| <b>PW-119+25-ST1-091118-(20)</b> |         |               |       |          |           |        |        |      |         |          |
| 1837065-01                       | As      | Water         | D     | 9.92     |           | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-01                       | Cu      | Water         | D     | 0.456    |           | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-01                       | Hg      | Water         | D     | 0.17     | J         | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-01                       | Ni      | Water         | D     | 0.924    |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-01                       | Pb      | Water         | D     | 0.0192   |           | 0.0051 | 0.0152 | µg/L | B182471 | 1801318  |
| <b>PW-120+75-ST1-091118-(20)</b> |         |               |       |          |           |        |        |      |         |          |
| 1837065-02                       | As      | Water         | D     | 47.5     |           | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-02                       | Cu      | Water         | D     | 0.0725   |           | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-02                       | Hg      | Water         | D     | 0.14     | J         | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-02                       | Ni      | Water         | D     | 0.559    |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-02                       | Pb      | Water         | D     | ≤ 0.0051 | U         | 0.0051 | 0.0152 | µg/L | B182471 | 1801318  |
| <b>PW-123+25-ST1-091218-(20)</b> |         |               |       |          |           |        |        |      |         |          |
| 1837065-03                       | As      | Water         | D     | 189      |           | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-03                       | Cu      | Water         | D     | 0.219    |           | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-03                       | Hg      | Water         | D     | 0.21     | J         | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-03                       | Ni      | Water         | D     | 1.32     |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-03                       | Pb      | Water         | D     | 0.0058   | J         | 0.0051 | 0.0152 | µg/L | B182471 | 1801318  |
| <b>PW-125+00-ST1-091218-(20)</b> |         |               |       |          |           |        |        |      |         |          |
| 1837065-04                       | As      | Water         | D     | 20.7     |           | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-04                       | Cu      | Water         | D     | 1.20     |           | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-04                       | Hg      | Water         | D     | 2.79     |           | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-04                       | Ni      | Water         | D     | 0.868    |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-04                       | Pb      | Water         | D     | 0.0202   |           | 0.0051 | 0.0152 | µg/L | B182471 | 1801318  |
| <b>PW-126+80-ST1-091218-(20)</b> |         |               |       |          |           |        |        |      |         |          |
| 1837065-05                       | As      | Water         | D     | 18.6     |           | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-05                       | Cu      | Water         | D     | 0.969    |           | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-05                       | Hg      | Water         | D     | 0.40     | H J       | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-05                       | Ni      | Water         | D     | 0.674    |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-05                       | Pb      | Water         | D     | 0.0120   | J         | 0.0051 | 0.0152 | µg/L | B182471 | 1801318  |





## Sample Results

| Sample                           | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL    | Unit | Batch   | Sequence |
|----------------------------------|---------|---------------|-------|----------|-----------|--------|--------|------|---------|----------|
| <b>PW-128+50-ST1-091318-(20)</b> |         |               |       |          |           |        |        |      |         |          |
| 1837065-06                       | As      | Water         | D     | 69.3     |           | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-06                       | Cu      | Water         | D     | 0.0423   | J         | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-06                       | Hg      | Water         | D     | 0.44     |           | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-06                       | Ni      | Water         | D     | 0.541    |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-06                       | Pb      | Water         | D     | 0.0052   | J         | 0.0051 | 0.0152 | µg/L | B182471 | 1801318  |
| <b>PW-128+50-ST1-091318-(21)</b> |         |               |       |          |           |        |        |      |         |          |
| 1837065-07                       | As      | Water         | D     | 70.4     |           | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-07                       | Cu      | Water         | D     | 0.0356   | J         | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-07                       | Hg      | Water         | D     | 0.53     |           | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-07                       | Ni      | Water         | D     | 0.529    |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-07                       | Pb      | Water         | D     | 0.0060   | J         | 0.0051 | 0.0152 | µg/L | B182471 | 1801318  |
| <b>PW-130+75-ST1-091318-(20)</b> |         |               |       |          |           |        |        |      |         |          |
| 1837065-08                       | As      | Water         | D     | 5.51     |           | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-08                       | Cu      | Water         | D     | 0.135    |           | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-08                       | Hg      | Water         | D     | 0.16     | J         | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-08                       | Ni      | Water         | D     | 0.936    |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-08                       | Pb      | Water         | D     | ≤ 0.0051 | U         | 0.0051 | 0.0152 | µg/L | B182471 | 1801318  |
| <b>FB-PPS-091318-(20)</b>        |         |               |       |          |           |        |        |      |         |          |
| 1837065-09                       | As      | Water         | D     | ≤ 0.449  | U         | 0.449  | 1.63   | µg/L | B182470 | 1801289  |
| 1837065-09                       | Cu      | Water         | D     | 0.494    |           | 0.0152 | 0.0455 | µg/L | B182471 | 1801318  |
| 1837065-09                       | Hg      | Water         | D     | 0.19     | J         | 0.13   | 0.40   | ng/L | B182462 | 1801273  |
| 1837065-09                       | Ni      | Water         | D     | 0.0612   |           | 0.0071 | 0.0303 | µg/L | B182471 | 1801318  |
| 1837065-09                       | Pb      | Water         | D     | 123      |           | 0.253  | 0.758  | µg/L | B182471 | 1801318  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837065  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B182462  
**Lab Matrix:** Water  
**Method:** EPA 1631 E

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182462-SRM1 | Standard Reference Material (1836073, THg SRM NIST 1641d)<br>Hg |        | 1568  | 1769   | ng/L  | 113% 80-120  |              |
| B182462-MS3  | Matrix Spike (1837065-06)<br>Hg                                 | 0.44   | 4.040 | 4.65   | ng/L  | 104% 71-125  |              |
| B182462-MSD3 | Matrix Spike Duplicate (1837065-06)<br>Hg                       | 0.44   | 4.040 | 4.62   | ng/L  | 103% 71-125  | 0.7% 24      |



## Accuracy & Precision Summary

Batch: B182470  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182470-BS1  | Blank Spike, (1838033)<br>As  |        | 20.00 | 20.96  | µg/L  | 105% 75-125  |              |
| B182470-SRM1 | Standard Reference Material (1811029, T221 as SRM)<br>As            |        | 17.70 | 17.48  | µg/L  | 99% 75-125   |              |
| B182470-SRM2 | Standard Reference Material (1710041, NIST 1643f (batch SRM))<br>As |        | 57.42 | 57.02  | µg/L  | 99% 75-125   |              |
| B182470-DUP1 | Duplicate, (1837065-01)<br>As                                       | 9.916  |       | 9.506  | µg/L  |              | 4% 20        |
| B182470-MS1  | Matrix Spike, (1837065-01)<br>As                                    | 9.916  | 408.2 | 469.2  | µg/L  | 113% 75-125  |              |
| B182470-MSD1 | Matrix Spike Duplicate, (1837065-01)<br>As                          | 9.916  | 408.2 | 482.7  | µg/L  | 116% 75-125  | 3% 20        |



## Accuracy & Precision Summary

Batch: B182471  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte  | Native | Spike    | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|----------|--------|-------|--------------|--------------|
| B182471-BS1  | <b>Blank Spike, (1825037)</b>                        |        |          |        |       |              |              |
|              | Cu   |        | 0.5000   | 0.5558 | µg/L  | 111% 75-125  |              |
|              | Ni   |        | 0.5000   | 0.5374 | µg/L  | 107% 75-125  |              |
|              | Pb   |        | 0.5000   | 0.5981 | µg/L  | 120% 75-125  |              |
| B182471-SRM1 | <b>Standard Reference Material (1741024, NASS-7)</b> |        |          |        |       |              |              |
|              | Cu   |        | 0.1990   | 0.2106 | µg/L  | 106% 75-125  |              |
|              | Ni   |        | 0.2480   | 0.2430 | µg/L  | 98% 75-125   |              |
| B182471-SRM2 | <b>Standard Reference Material (1808030, SLEW-3)</b> |        |          |        |       |              |              |
|              | Cu   |        | 1.550    | 1.758  | µg/L  | 113% 70-130  |              |
|              | Ni   |        | 1.230    | 1.343  | µg/L  | 109% 70-130  |              |
|              | Pb   |        | 0.009000 | 0.0078 | µg/L  | 87% 70-130   |              |
| B182471-DUP1 | <b>Duplicate, (1837065-08)</b>                       |        |          |        |       |              |              |
|              | Cu   | 0.1354 |          | 0.1544 | µg/L  |              | 13% 20       |
|              | Ni   | 0.9359 |          | 0.9375 | µg/L  |              | 0.2% 20      |
|              | Pb   | ND     |          | ND     | µg/L  |              | N/C 20       |
| B182471-MS1  | <b>Matrix Spike, (1837065-08)</b>                    |        |          |        |       |              |              |
|              | Cu   | 0.1354 | 0.5051   | 0.6814 | µg/L  | 108% 75-125  |              |
|              | Ni   | 0.9359 | 0.5051   | 1.432  | µg/L  | 98% 75-125   |              |
|              | Pb   | ND     | 0.5051   | 0.5052 | µg/L  | 100% 75-125  |              |
| B182471-MSD1 | <b>Matrix Spike Duplicate, (1837065-08)</b>          |        |          |        |       |              |              |
|              | Cu   | 0.1354 | 0.5051   | 0.6869 | µg/L  | 109% 75-125  | 0.8% 20      |
|              | Ni   | 0.9359 | 0.5051   | 1.433  | µg/L  | 98% 75-125   | 0.1% 20      |
|              | Pb   | ND     | 0.5051   | 0.5002 | µg/L  | 99% 75-125   | 1% 20        |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837065  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182462  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample       | Result               | Units |                                 |                  |
|--------------|----------------------|-------|---------------------------------|------------------|
| B182462-BLK1 | 0.09                 | ng/L  |                                 |                  |
| B182462-BLK2 | -0.005               | ng/L  |                                 |                  |
| B182462-BLK3 | 0.15                 | ng/L  |                                 |                  |
| B182462-BLK4 | 0.09                 | ng/L  |                                 |                  |
|              | <b>Average:</b> 0.08 |       | <b>Standard Deviation:</b> 0.06 | <b>MDL:</b> 0.13 |
|              | <b>Limit:</b> 0.50   |       | <b>Limit:</b> 0.13              | <b>MRL:</b> 0.40 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837065  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182470  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** As

| Sample       | Result  | Units |
|--------------|---------|-------|
| B182470-BLK1 | -0.0008 | µg/L  |
| B182470-BLK2 | 0.0002  | µg/L  |
| B182470-BLK3 | -0.0002 | µg/L  |
| B182470-BLK4 | -0.0002 | µg/L  |

**Average:** 0.000  
**Limit:** 0.040

**MDL:** 0.011  
**MRL:** 0.040



## Method Blanks & Reporting Limits

**Batch:** B182471  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Cu

| Sample          | Result         | Units |                    |
|-----------------|----------------|-------|--------------------|
| B182471-BLK1    | -0.0010        | µg/L  |                    |
| B182471-BLK2    | -0.0017        | µg/L  |                    |
| B182471-BLK3    | 0.0014         | µg/L  |                    |
| B182471-BLK4    | -0.0009        | µg/L  |                    |
| <b>Average:</b> | <b>-0.0006</b> |       | <b>MDL: 0.0150</b> |
| <b>Limit:</b>   | <b>0.0450</b>  |       | <b>MRL: 0.0450</b> |

**Analyte:** Ni

| Sample          | Result        | Units |                    |
|-----------------|---------------|-------|--------------------|
| B182471-BLK1    | 0.0048        | µg/L  |                    |
| B182471-BLK2    | 0.0013        | µg/L  |                    |
| B182471-BLK3    | 0.0004        | µg/L  |                    |
| B182471-BLK4    | 0.0011        | µg/L  |                    |
| <b>Average:</b> | <b>0.0019</b> |       | <b>MDL: 0.0070</b> |
| <b>Limit:</b>   | <b>0.0300</b> |       | <b>MRL: 0.0300</b> |

**Analyte:** Pb

| Sample          | Result        | Units |                    |
|-----------------|---------------|-------|--------------------|
| B182471-BLK1    | -0.000003     | µg/L  |                    |
| B182471-BLK2    | -0.000003     | µg/L  |                    |
| B182471-BLK3    | -0.000005     | µg/L  |                    |
| B182471-BLK4    | -0.000005     | µg/L  |                    |
| <b>Average:</b> | <b>0.0000</b> |       | <b>MDL: 0.0050</b> |
| <b>Limit:</b>   | <b>0.0150</b> |       | <b>MRL: 0.0150</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837065  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1837065-01                |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 09/11/2018 |                     |
|--|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-119+25-ST1-091118-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 09/14/2018  |                     |
| <b>Des</b>                               | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A  | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler -<br>1837065 |
| B  | Bottle HDPE ICP-W           | 125 mL      | 18-0175                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler -<br>1837065 |
| C  | EXTRA_VOL                   | 125 mL      | 18-0175                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler -<br>1837065 |

| <b>Lab ID:</b> 1837065-02                |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 09/11/2018 |                     |
|--|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-120+75-ST1-091118-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 09/14/2018  |                     |
| <b>Des</b>                               | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A  | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler -<br>1837065 |
| B  | Bottle HDPE ICP-W           | 125 mL      | 18-0175                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler -<br>1837065 |
| C  | EXTRA_VOL                   | 125 mL      | 18-0175                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler -<br>1837065 |

| <b>Lab ID:</b> 1837065-03                |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 09/12/2018 |                     |
|--|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-123+25-ST1-091218-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 09/14/2018  |                     |
| <b>Des</b>                               | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A  | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler -<br>1837065 |
| B  | Bottle HDPE ICP-W           | 125 mL      | 18-0175                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler -<br>1837065 |
| C  | EXTRA_VOL                   | 125 mL      | 18-0175                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler -<br>1837065 |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837065  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1837065-04                |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 09/12/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-125+00-ST1-091218-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 09/14/2018  |                    |
| <b>Des</b>                               | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler - 1837065   |
| B  | Bottle HDPE ICP-W        | 125 mL      | 18-0175                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler - 1837065   |
| C  | EXTRA_VOL                | 125 mL      | 18-0084                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler - 1837065   |

| <b>Lab ID:</b> 1837065-05                |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 09/12/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-126+80-ST1-091218-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 09/14/2018  |                    |
| <b>Des</b>                               | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler - 1837065   |
| B  | Bottle HDPE ICP-W        | 125 mL      | 18-0175                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler - 1837065   |
| C  | EXTRA_VOL                | 125 mL      | 18-0175                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler - 1837065   |

| <b>Lab ID:</b> 1837065-06                |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 09/13/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-128+50-ST1-091318-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 09/14/2018  |                    |
| <b>Des</b>                               | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler - 1837065   |
| B  | Bottle HDPE ICP-W        | 125 mL      | 18-0175                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler - 1837065   |
| C  | EXTRA_VOL                | 125 mL      | 18-0084                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler - 1837065   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837065  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1837065-07                |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 09/13/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-128+50-ST1-091318-(21) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 09/14/2018  |                    |
| <b>Des</b>                               | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler - 1837065   |
| B  | Bottle HDPE ICP-W        | 125 mL      | 18-0175                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler - 1837065   |
| C  | EXTRA_VOL                | 125 mL      | 18-0084                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler - 1837065   |

| <b>Lab ID:</b> 1837065-08                |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 09/13/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> PW-130+75-ST1-091318-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 09/14/2018  |                    |
| <b>Des</b>                               | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler - 1837065   |
| B  | Bottle HDPE ICP-W        | 125 mL      | 18-0084                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler - 1837065   |
| C  | EXTRA_VOL                | 125 mL      | 18-0084                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler - 1837065   |

| <b>Lab ID:</b> 1837065-09         |                          |             | <b>Report Matrix:</b> Water     |                        |              | <b>Collected:</b> 09/13/2018 |                    |
|-----------------------------------|--------------------------|-------------|---------------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> FB-PPS-091318-(20) |                          |             | <b>Sample Type:</b> Field Blank |                        |              | <b>Received:</b> 09/14/2018  |                    |
| <b>Des</b>                        | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                      | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                 | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                         | none                   | n/a          |                              | Cooler - 1837065   |
| B                                 | Bottle HDPE ICP-W        | 125 mL      | 18-0084                         | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler - 1837065   |
| C                                 | EXTRA_VOL                | 125 mL      | 18-0084                         | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler - 1837065   |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837065  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### **Cooler - 1837065**

**Received:** September 14, 2018 13:35  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 4.5 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#17

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

Received by: [Signature] For BAL use only Date: 9/14/18  
 Work Order ID: 1537065 Time: 1335  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

| Requested TAT<br>(business days)   |                           | Collection           |      | Client Sample Info |                      |                                 |                   | BAL Analyses Required  |   |   |                                      |             |  | Comments |  |              |
|--|---------------------------|----------------------|------|--------------------|----------------------|---------------------------------|-------------------|--|---|---|--------------------------------------|-------------|--|----------|--|--------------|
|  |                           | Date                 | Time | Matrix Type        | Number of Containers | Field Filtered?                 | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |             |  |          |  |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> |                           |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |              |
| Sample ID  |                           | Specify Here         |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |              |
| 1  | PW-119+25-ST1-091118-(20) | 09/11/18             | 1130 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 47,244 uS/cm |
| 2  | PW-120+75-ST1-091118-(20) | 09/11/18             | 1245 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 46,596 uS/cm |
| 3  | PW-123+25-ST1-091218-(20) | 09/12/18             | 1000 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 46,330 uS/cm |
| 4  | PW-125+00-ST1-091218-(20) | 09/12/18             | 1200 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 44,875 uS/cm |
| 5  | PW-126+80-ST1-091218-(20) | 09/12/18             | 1400 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 47,329 uS/cm |
| 6  | PW-128+50-ST1-091318-(20) | 09/13/18             | 1215 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 47,029 uS/cm |
| 7  | PW-128+50-ST1-091318-(21) | 09/13/18             | 1220 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 47,029 uS/cm |
| 8  | PW-130+75-ST1-091318-(20) | 09/13/18             | 1415 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 47,610 uS/cm |
| 9  | FB-PPS-091318-(20)        | 09/13/18             | 1515 | Water              | 3                    | Yes                             | None              |  |   | ✓   | ✓                                    |             |  |          |  | 45 uS/cm     |
| 10   | Trip Blank (specify)      |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |              |
| Relinquished By: <u>[Signature]</u>  |                           | Date: <u>9/14/18</u> |      | Time: <u>1315</u>  |                      | Relinquished By: _____          |                   |  |   | Date: _____   |                                      | Time: _____ |  |          |  |              |
| Received By: <u>[Signature]</u>  |                           | Date: <u>9/14/18</u> |      | Time: <u>1315</u>  |                      | Total Number of Packages: _____ |                   |  |   |   |                                      |             |  |          |  |              |

**Print**



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 27, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On October 12, 2018, Brooks Applied Labs (BAL) received thirty-one (31) water samples in a sealed container with a temperature of 3.0°C. The samples were logged-in for dissolved arsenic [As] analyses via digestion and subsequent analysis by modified EPA Method 1638. The samples were logged in for dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. The samples were logged-in for the dissolved mercury [Hg] analysis by EPA Method 1631E, according to the chain-of-custody (COC) forms.

The samples submitted for dissolved analyses were filtered in the field by the client.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives was monitored for contamination to account for any biases associated with the sample results.

*Dissolved Metals (As) Analysis by EPA Method 1638, Mod.*

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Dissolved arsenic quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

**Batch B182794**

The internal standard recoveries for 1841055-21 (57%), B182794-DUP8 (59%), B182794-MS8 (55%), and B182794-MSD8 (55%) were less than the lower control limit of 60%, ran. The matrix quality control sample recoveries were within acceptable limits and the lab dup yielded an acceptable relative percent difference (RPD), demonstrating that the internal standards appropriately corrected for variability in sensitivity within the analytical platform. No corrective actions were necessary. The client sample result and QC sample results with the internal standard recovery outliers were reported without qualification.

Arsenic results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL

is set by a low calibration standard in the calibration for most analytes. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Dissolved metals (Cu, Ni, and Pb) Analysis by EPA Method 1640, Mod.

Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid ( $\text{HNO}_3$ ) and then prepared according to EPA Method 1640. All sample fractions for dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). The ICP-DRC-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

#### **Batch B182779**

Dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### **Batch B182835**

Dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Dissolved Mercury Quantitation by EPA Method 1631E

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride ( $\text{BrCl}$ ) and then analyzed with stannous chloride ( $\text{SnCl}_2$ ) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

**Batch B182790**

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,



Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksapplied.com





## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Please see narrative for explanation.                                      |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.                               |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Please see narrative for explanation.  |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.





## Sample Information

| Sample                  | Lab ID     | Report Matrix | Type         | Sampled    | Received   |
|-------------------------|------------|---------------|--------------|------------|------------|
| GW-131+00-1-100818-(20) | 1841055-01 | Water         | Sample       | 10/08/2018 | 10/12/2018 |
| GW-131+00-2-100818-(20) | 1841055-02 | Water         | Sample       | 10/08/2018 | 10/12/2018 |
| GW-129+65-1-100818-(20) | 1841055-03 | Water         | Sample       | 10/08/2018 | 10/12/2018 |
| GW-129+65-2-100818-(20) | 1841055-04 | Water         | Sample       | 10/08/2018 | 10/12/2018 |
| GW-128+30-1-100818-(20) | 1841055-05 | Water         | Sample       | 10/08/2018 | 10/12/2018 |
| GW-128+30-2-100818-(20) | 1841055-06 | Water         | Sample       | 10/08/2018 | 10/12/2018 |
| GW-126+90-2-100818-(20) | 1841055-07 | Water         | Sample       | 10/08/2018 | 10/12/2018 |
| GW-6E3-2-100918-(20)    | 1841055-08 | Water         | Sample       | 10/09/2018 | 10/12/2018 |
| GW-128+30-0-100918-(20) | 1841055-09 | Water         | Sample       | 10/09/2018 | 10/12/2018 |
| GW-129+65-0-100918-(20) | 1841055-10 | Water         | Sample       | 10/09/2018 | 10/12/2018 |
| GW-126+90-0-101018-(20) | 1841055-11 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-125+50-0-101018-(20) | 1841055-12 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-126+90-1-101018-(20) | 1841055-13 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-125+50-1-101018-(20) | 1841055-14 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-125+50-2-101018-(20) | 1841055-15 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-122+60-0-101018-(20) | 1841055-16 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-124+00-0-101018-(20) | 1841055-17 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-124+00-1-101018-(20) | 1841055-18 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-124+00-2-101018-(20) | 1841055-19 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-122+60-1-101018-(20) | 1841055-20 | Water         | Sample       | 10/10/2018 | 10/12/2018 |
| GW-124+00-0-101118-(20) | 1841055-21 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-125+50-0-101118-(20) | 1841055-22 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-126+90-0-101118-(20) | 1841055-23 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-122+60-2-101118-(20) | 1841055-24 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-5B1-1R-101118-(20)   | 1841055-25 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-5B1-1R-101118-(21)   | 1841055-26 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-121+80-1-101118-(20) | 1841055-27 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-121+80-2-101118-(20) | 1841055-28 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-5B1-2R-101118-(20)   | 1841055-29 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-120+75-2-101118-(20) | 1841055-30 | Water         | Sample       | 10/11/2018 | 10/12/2018 |
| GW-EB-EB-101218-(20)    | 1841055-31 | Water         | Equip. Blank | 10/12/2018 | 10/12/2018 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Batch Summary

| Analyte | Lab Matrix | Method          | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|-----------------|------------|------------|---------|----------|
| As      | Water      | EPA 1638 Mod    | 10/18/2018 | 11/01/2018 | B182794 | 1801476  |
| As      | Water      | EPA 1638 Mod    | 10/18/2018 | 11/07/2018 | B182794 | 1801518  |
| As      | Water      | EPA 1638 Mod    | 10/18/2018 | 11/13/2018 | B182794 | 1801532  |
| As      | Water      | EPA 1638 Mod    | 10/18/2018 | 11/17/2018 | B182794 | 1801558  |
| Cu      | Water      | EPA 1640 Column | 10/17/2018 | 10/23/2018 | B182835 | 1801430  |
| Hg      | Water      | EPA 1631 E      | 10/18/2018 | 10/19/2018 | B182790 | 1801419  |
| Ni      | Water      | EPA 1640 Column | 10/17/2018 | 10/20/2018 | B182779 | 1801425  |
| Ni      | Water      | EPA 1640 Column | 10/17/2018 | 10/23/2018 | B182779 | 1801430  |
| Pb      | Water      | EPA 1640 Column | 10/17/2018 | 10/23/2018 | B182835 | 1801430  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|----------|-----------|--------|-------|------|---------|----------|
| <b>GW-131+00-1-100818-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-01                     | As      | Water         | D     | 0.520    | J         | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-01                     | Cu      | Water         | D     | 8.80     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-01                     | Hg      | Water         | D     | 0.85     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-01                     | Ni      | Water         | D     | 1260     |           | 7.07   | 50.5  | µg/L | B182779 | 1801430  |
| 1841055-01                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-131+00-2-100818-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-02                     | As      | Water         | D     | 2.75     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-02                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-02                     | Hg      | Water         | D     | 0.25     | J         | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-02                     | Ni      | Water         | D     | 13.7     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-02                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-129+65-1-100818-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-03                     | As      | Water         | D     | 1.91     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-03                     | Cu      | Water         | D     | 55.2     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-03                     | Hg      | Water         | D     | 9.65     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-03                     | Ni      | Water         | D     | 1520     |           | 7.07   | 30.3  | µg/L | B182779 | 1801430  |
| 1841055-03                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-129+65-2-100818-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-04                     | As      | Water         | D     | 8.65     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-04                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-04                     | Hg      | Water         | D     | 0.43     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-04                     | Ni      | Water         | D     | 5.60     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-04                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-128+30-1-100818-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-05                     | As      | Water         | D     | 15.7     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-05                     | Cu      | Water         | D     | 7.14     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-05                     | Hg      | Water         | D     | 0.27     | J         | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-05                     | Ni      | Water         | D     | 4230     |           | 7.07   | 50.5  | µg/L | B182779 | 1801430  |
| 1841055-05                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|----------|-----------|--------|-------|------|---------|----------|
| <b>GW-128+30-2-100818-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-06                     | As      | Water         | D     | 625      |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-06                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-06                     | Hg      | Water         | D     | 2.25     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-06                     | Ni      | Water         | D     | 1.54     | J         | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-06                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-126+90-2-100818-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-07                     | As      | Water         | D     | 909      |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-07                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-07                     | Hg      | Water         | D     | 1.33     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-07                     | Ni      | Water         | D     | 3.76     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-07                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-6E3-2-100918-(20)</b>    |         |               |       |          |           |        |       |      |         |          |
| 1841055-08                     | As      | Water         | D     | 66000    |           | 24.5   | 81.6  | µg/L | B182794 | 1801518  |
| 1841055-08                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-08                     | Hg      | Water         | D     | 0.27     | J         | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-08                     | Ni      | Water         | D     | 28.7     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-08                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-128+30-0-100918-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-09                     | As      | Water         | D     | 13.2     |           | 0.490  | 1.63  | µg/L | B182794 | 1801518  |
| 1841055-09                     | Cu      | Water         | D     | 3.81     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-09                     | Hg      | Water         | D     | 1.47     |           | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-09                     | Ni      | Water         | D     | 372      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-09                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-129+65-0-100918-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-10                     | As      | Water         | D     | 2.55     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-10                     | Cu      | Water         | D     | 2.79     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-10                     | Hg      | Water         | D     | 0.99     |           | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-10                     | Ni      | Water         | D     | 1230     |           | 7.07   | 50.5  | µg/L | B182779 | 1801430  |
| 1841055-10                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|----------|-----------|--------|-------|------|---------|----------|
| <b>GW-126+90-0-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-11                     | As      | Water         | D     | 29.7     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-11                     | Cu      | Water         | D     | 3.24     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-11                     | Hg      | Water         | D     | 2.33     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-11                     | Ni      | Water         | D     | 438      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-11                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-125+50-0-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-12                     | As      | Water         | D     | 101      |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-12                     | Cu      | Water         | D     | 4.88     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-12                     | Hg      | Water         | D     | 9.75     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-12                     | Ni      | Water         | D     | 427      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-12                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-126+90-1-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-13                     | As      | Water         | D     | 95.2     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-13                     | Cu      | Water         | D     | 3.06     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-13                     | Hg      | Water         | D     | 46.6     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-13                     | Ni      | Water         | D     | 104      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-13                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-125+50-1-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-14                     | As      | Water         | D     | 80.7     |           | 0.490  | 1.63  | µg/L | B182794 | 1801518  |
| 1841055-14                     | Cu      | Water         | D     | 2.30     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-14                     | Hg      | Water         | D     | 5.64     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-14                     | Ni      | Water         | D     | 32.9     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-14                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-125+50-2-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-15                     | As      | Water         | D     | 706      |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-15                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-15                     | Hg      | Water         | D     | 0.59     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-15                     | Ni      | Water         | D     | 0.906    | J         | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-15                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|----------|-----------|--------|-------|------|---------|----------|
| <b>GW-122+60-0-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-16                     | As      | Water         | D     | 9.68     |           | 0.490  | 1.63  | µg/L | B182794 | 1801518  |
| 1841055-16                     | Cu      | Water         | D     | 3.69     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-16                     | Hg      | Water         | D     | 2.08     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-16                     | Ni      | Water         | D     | 482      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-16                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-124+00-0-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-17                     | As      | Water         | D     | 8.11     |           | 0.490  | 1.63  | µg/L | B182794 | 1801518  |
| 1841055-17                     | Cu      | Water         | D     | 2.81     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-17                     | Hg      | Water         | D     | 0.88     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-17                     | Ni      | Water         | D     | 150      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-17                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-124+00-1-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-18                     | As      | Water         | D     | 1100     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-18                     | Cu      | Water         | D     | 2.74     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-18                     | Hg      | Water         | D     | 1.83     |           | 0.13   | 0.40  | ng/L | B182790 | 1801419  |
| 1841055-18                     | Ni      | Water         | D     | 20.2     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-18                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-124+00-2-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-19                     | As      | Water         | D     | 76200    |           | 24.5   | 81.6  | µg/L | B182794 | 1801518  |
| 1841055-19                     | Cu      | Water         | D     | 0.380    | J         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-19                     | Hg      | Water         | D     | 14.5     |           | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-19                     | Ni      | Water         | D     | 16.9     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-19                     | Pb      | Water         | D     | 0.221    |           | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-122+60-1-101018-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-20                     | As      | Water         | D     | 26.1     |           | 0.490  | 1.63  | µg/L | B182794 | 1801518  |
| 1841055-20                     | Cu      | Water         | D     | 3.25     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-20                     | Hg      | Water         | D     | 0.63     |           | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-20                     | Ni      | Water         | D     | 239      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-20                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |



## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|----------|-----------|--------|-------|------|---------|----------|
| <b>GW-124+00-0-101118-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-21                     | As      | Water         | D     | 8.42     |           | 0.490  | 1.63  | µg/L | B182794 | 1801558  |
| 1841055-21                     | Cu      | Water         | D     | 2.34     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-21                     | Hg      | Water         | D     | 0.36     | J         | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-21                     | Ni      | Water         | D     | 158      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-21                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-125+50-0-101118-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-22                     | As      | Water         | D     | 106      |           | 0.490  | 1.63  | µg/L | B182794 | 1801558  |
| 1841055-22                     | Cu      | Water         | D     | 7.63     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-22                     | Hg      | Water         | D     | 7.61     |           | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-22                     | Ni      | Water         | D     | 492      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-22                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-126+90-0-101118-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-23                     | As      | Water         | D     | 28.7     |           | 0.490  | 1.63  | µg/L | B182794 | 1801518  |
| 1841055-23                     | Cu      | Water         | D     | 5.20     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-23                     | Hg      | Water         | D     | 1.59     |           | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-23                     | Ni      | Water         | D     | 450      |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-23                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-122+60-2-101118-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-24                     | As      | Water         | D     | 2850     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-24                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-24                     | Hg      | Water         | D     | 0.40     | J         | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-24                     | Ni      | Water         | D     | 22.7     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-24                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-5B1-1R-101118-(20)</b>   |         |               |       |          |           |        |       |      |         |          |
| 1841055-25                     | As      | Water         | D     | 1320     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-25                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-25                     | Hg      | Water         | D     | 15.1     |           | 0.13   | 0.41  | ng/L | B182790 | 1801419  |
| 1841055-25                     | Ni      | Water         | D     | 2.90     | J         | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-25                     | Pb      | Water         | D     | 0.0739   | J         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |





## Sample Results

| Sample                         | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL   | Unit | Batch   | Sequence |
|--------------------------------|---------|---------------|-------|----------|-----------|--------|-------|------|---------|----------|
| <b>GW-5B1-1R-101118-(21)</b>   |         |               |       |          |           |        |       |      |         |          |
| 1841055-26                     | As      | Water         | D     | 1400     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-26                     | Cu      | Water         | D     | 0.622    |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-26                     | Hg      | Water         | D     | 20.0     |           | 0.13   | 0.41  | ng/L | B182790 | 1801419  |
| 1841055-26                     | Ni      | Water         | D     | 3.10     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-26                     | Pb      | Water         | D     | 0.953    |           | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-121+80-1-101118-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-27                     | As      | Water         | D     | 1850     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-27                     | Cu      | Water         | D     | 8.72     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-27                     | Hg      | Water         | D     | 285      |           | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-27                     | Ni      | Water         | D     | 11.3     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-27                     | Pb      | Water         | D     | 1.76     |           | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-121+80-2-101118-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-28                     | As      | Water         | D     | 1560     |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-28                     | Cu      | Water         | D     | 4.99     |           | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-28                     | Hg      | Water         | D     | 10.7     |           | 0.14   | 0.42  | ng/L | B182790 | 1801419  |
| 1841055-28                     | Ni      | Water         | D     | 16.8     |           | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-28                     | Pb      | Water         | D     | 1.25     |           | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-5B1-2R-101118-(20)</b>   |         |               |       |          |           |        |       |      |         |          |
| 1841055-29                     | As      | Water         | D     | 0.884    | J         | 0.490  | 1.63  | µg/L | B182794 | 1801532  |
| 1841055-29                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-29                     | Hg      | Water         | D     | ≤ 0.13   | U         | 0.13   | 0.41  | ng/L | B182790 | 1801419  |
| 1841055-29                     | Ni      | Water         | D     | ≤ 0.707  | U         | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-29                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |
| <b>GW-120+75-2-101118-(20)</b> |         |               |       |          |           |        |       |      |         |          |
| 1841055-30                     | As      | Water         | D     | 139      |           | 0.490  | 1.63  | µg/L | B182794 | 1801476  |
| 1841055-30                     | Cu      | Water         | D     | ≤ 0.152  | U         | 0.152  | 0.455 | µg/L | B182835 | 1801430  |
| 1841055-30                     | Hg      | Water         | D     | 0.29     | J         | 0.13   | 0.41  | ng/L | B182790 | 1801419  |
| 1841055-30                     | Ni      | Water         | D     | ≤ 0.707  | U         | 0.707  | 3.03  | µg/L | B182779 | 1801425  |
| 1841055-30                     | Pb      | Water         | D     | ≤ 0.0505 | U         | 0.0505 | 0.152 | µg/L | B182835 | 1801430  |



Project ID: PTC-OA1701  
PM: Jeremy Maute



BAL Report 1841055  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Results

| Sample                      | Analyte | Report Matrix | Basis | Result   | Qualifier | MDL    | MRL    | Unit | Batch   | Sequence |
|-----------------------------|---------|---------------|-------|----------|-----------|--------|--------|------|---------|----------|
| <b>GW-EB-EB-101218-(20)</b> |         |               |       |          |           |        |        |      |         |          |
| 1841055-31                  | As      | Water         | D     | ≤ 0.012  | U         | 0.012  | 0.041  | µg/L | B182794 | 1801476  |
| 1841055-31                  | Cu      | Water         | D     | ≤ 0.0152 | U         | 0.0152 | 0.0455 | µg/L | B182835 | 1801430  |
| 1841055-31                  | Hg      | Water         | D     | ≤ 0.13   | U         | 0.13   | 0.40   | ng/L | B182790 | 1801419  |
| 1841055-31                  | Ni      | Water         | D     | ≤ 0.0071 | U         | 0.0071 | 0.0303 | µg/L | B182779 | 1801425  |
| 1841055-31                  | Pb      | Water         | D     | ≤ 0.0051 | U         | 0.0051 | 0.0152 | µg/L | B182835 | 1801430  |



## Accuracy & Precision Summary

Batch: B182779  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte   | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|--------|--------|-------|--------------|--------------|
| B182779-BS1  | Blank Spike, (1825037)<br>Ni                        |        | 0.5000 | 0.5201 | µg/L  | 104% 75-125  |              |
| B182779-BS2  | Blank Spike, (1825037)<br>Ni                        |        | 0.5000 | 0.6213 | µg/L  | 124% 75-125  |              |
| B182779-SRM1 | Standard Reference Material (1741024, NASS-7)<br>Ni |        | 0.2480 | 0.2398 | µg/L  | 97% 75-125   |              |
| B182779-SRM2 | Standard Reference Material (1808030, SLEW-3)<br>Ni |        | 1.230  | 1.339  | µg/L  | 109% 70-130  |              |
| B182779-DUP1 | Duplicate, (1841053-08)<br>Ni                       | 0.1848 |        | 0.1871 | µg/L  |              | 1% 20        |
| B182779-MS1  | Matrix Spike, (1841053-08)<br>Ni                    | 0.1848 | 0.5051 | 0.7014 | µg/L  | 102% 75-125  |              |
| B182779-MSD1 | Matrix Spike Duplicate, (1841053-08)<br>Ni          | 0.1848 | 0.5051 | 0.7033 | µg/L  | 103% 75-125  | 0.3% 20      |
| B182779-DUP5 | Duplicate, (1841055-10)<br>Ni                       | 1229   |        | 1225   | µg/L  |              | 0.3% 20      |
| B182779-MS5  | Matrix Spike, (1841055-10)<br>Ni                    | 1229   | 505.1  | 1728   | µg/L  | 99% 75-125   |              |
| B182779-MSD5 | Matrix Spike Duplicate, (1841055-10)<br>Ni          | 1229   | 505.1  | 1714   | µg/L  | 96% 75-125   | 0.8% 20      |
| B182779-DUP3 | Duplicate, (1841055-20)<br>Ni                       | 239.5  |        | 239.7  | µg/L  |              | 0.1% 20      |
| B182779-MS3  | Matrix Spike, (1841055-20)<br>Ni                    | 239.5  | 50.51  | 262.1  | µg/L  | NR 75-125    |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B182779  
**Lab Matrix:** Water  
**Method:** EPA 1640 Column

| Sample              | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B182779-MSD3</b> | <b>Matrix Spike Duplicate, (1841055-20)</b><br>Ni | 239.5  | 50.51 | 288.7  | µg/L  | NR 75-125    | N/C 20       |
| <b>B182779-DUP4</b> | <b>Duplicate, (1841055-30)</b><br>Ni              | ND     |       | ND     | µg/L  |              | N/C 20       |
| <b>B182779-MS4</b>  | <b>Matrix Spike, (1841055-30)</b><br>Ni           | ND     | 50.51 | 50.59  | µg/L  | 100% 75-125  |              |
| <b>B182779-MSD4</b> | <b>Matrix Spike Duplicate, (1841055-30)</b><br>Ni | ND     | 50.51 | 52.27  | µg/L  | 103% 75-125  | 3% 20        |



## Accuracy & Precision Summary

Batch: B182790  
 Lab Matrix: Water  
 Method: EPA 1631 E

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182790-SRM1 | Standard Reference Material (1841003, THg SRM NIST 1641d)<br>Hg |        | 1568  | 1591   | ng/L  | 101% 80-120  |              |
| B182790-MS1  | Matrix Spike (1841055-14)<br>Hg                                 | 5.64   | 4.040 | 9.40   | ng/L  | 93% 71-125   |              |
| B182790-MSD1 | Matrix Spike Duplicate (1841055-14)<br>Hg                       | 5.64   | 4.040 | 9.27   | ng/L  | 90% 71-125   | 1% 24        |
| B182790-MS2  | Matrix Spike (1841055-16)<br>Hg                                 | 2.08   | 4.040 | 6.07   | ng/L  | 99% 71-125   |              |
| B182790-MSD2 | Matrix Spike Duplicate (1841055-16)<br>Hg                       | 2.08   | 4.040 | 5.88   | ng/L  | 94% 71-125   | 3% 24        |
| B182790-MS3  | Matrix Spike (1841055-20)<br>Hg                                 | 0.63   | 4.211 | 4.32   | ng/L  | 88% 71-125   |              |
| B182790-MSD3 | Matrix Spike Duplicate (1841055-20)<br>Hg                       | 0.63   | 4.211 | 4.41   | ng/L  | 90% 71-125   | 2% 24        |



## Accuracy & Precision Summary

Batch: B182794  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182794-BS1  | Blank Spike, (1842062)<br>As  |        | 20.00 | 22.01  | µg/L  | 110% 75-125  |              |
| B182794-BS2  | Blank Spike, (1842062)<br>As  |        | 20.00 | 21.82  | µg/L  | 109% 75-125  |              |
| B182794-SRM1 | Standard Reference Material (1841074, T221 as SRM)<br>As            |        | 17.70 | 17.71  | µg/L  | 100% 75-125  |              |
| B182794-SRM2 | Standard Reference Material (1836081, NIST 1643f (Batch SRM))<br>As |        | 57.42 | 57.13  | µg/L  | 99% 75-125   |              |
| B182794-DUP1 | Duplicate, (1841055-01)<br>As                                       | 0.520  |       | ND     | µg/L  |              | N/C 20       |
| B182794-MS1  | Matrix Spike, (1841055-01)<br>As                                    | 0.520  | 408.2 | 453.3  | µg/L  | 111% 75-125  |              |
| B182794-MSD1 | Matrix Spike Duplicate, (1841055-01)<br>As                          | 0.520  | 408.2 | 453.8  | µg/L  | 111% 75-125  | 0.1% 20      |
| B182794-DUP2 | Duplicate, (1841055-11)<br>As                                       | 29.70  |       | 30.13  | µg/L  |              | 1% 20        |
| B182794-MS2  | Matrix Spike, (1841055-11)<br>As                                    | 29.70  | 408.2 | 492.5  | µg/L  | 113% 75-125  |              |
| B182794-MSD2 | Matrix Spike Duplicate, (1841055-11)<br>As                          | 29.70  | 408.2 | 484.4  | µg/L  | 111% 75-125  | 2% 20        |
| B182794-DUP5 | Duplicate, (1841055-19)<br>As                                       | 76240  |       | 81850  | µg/L  |              | 7% 20        |
| B182794-MS5  | Matrix Spike, (1841055-19)<br>As                                    | 76240  | 20410 | 105300 | µg/L  | 142% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182794  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                                    | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B182794-MSD5 | Matrix Spike Duplicate, (1841055-19)<br>As | 76240  | 20410 | 99780  | µg/L  | 115% 75-125  | 5% 20        |
| B182794-DUP8 | Duplicate, (1841055-21)<br>As              | 8.422  |       | 7.743  | µg/L  |              | 8% 20        |
| B182794-MS8  | Matrix Spike, (1841055-21)<br>As           | 8.422  | 408.2 | 496.2  | µg/L  | 120% 75-125  |              |
| B182794-MSD8 | Matrix Spike Duplicate, (1841055-21)<br>As | 8.422  | 408.2 | 493.0  | µg/L  | 119% 75-125  | 0.7% 20      |
| B182794-DUP4 | Duplicate, (1841055-30)<br>As              | 138.6  |       | 138.8  | µg/L  |              | 0.09% 20     |
| B182794-MS4  | Matrix Spike, (1841055-30)<br>As           | 138.6  | 408.2 | 583.7  | µg/L  | 109% 75-125  |              |
| B182794-MSD4 | Matrix Spike Duplicate, (1841055-30)<br>As | 138.6  | 408.2 | 575.0  | µg/L  | 107% 75-125  | 1% 20        |



## Accuracy & Precision Summary

Batch: B182835  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte  | Native | Spike    | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|----------|--------|-------|--------------|--------------|
| B182835-BS1  | <b>Blank Spike, (1825037)</b>                        |        |          |        |       |              |              |
|              | Cu   |        | 0.5051   | 0.5368 | µg/L  | 106% 75-125  |              |
|              | Pb   |        | 0.5051   | 0.5553 | µg/L  | 110% 75-125  |              |
| B182835-BS2  | <b>Blank Spike, (1825037)</b>                        |        |          |        |       |              |              |
|              | Cu   |        | 0.5051   | 0.5381 | µg/L  | 107% 75-125  |              |
|              | Pb   |        | 0.5051   | 0.5544 | µg/L  | 110% 75-125  |              |
| B182835-SRM1 | <b>Standard Reference Material (1741024, NASS-7)</b> |        |          |        |       |              |              |
|              | Cu   |        | 0.2010   | 0.2087 | µg/L  | 104% 75-125  |              |
| B182835-SRM2 | <b>Standard Reference Material (1808030, SLEW-3)</b> |        |          |        |       |              |              |
|              | Cu   |        | 1.566    | 1.740  | µg/L  | 111% 70-130  |              |
|              | Pb   |        | 0.009091 | 0.0073 | µg/L  | 80% 70-130   |              |
| B182835-DUP1 | <b>Duplicate, (1841053-01)</b>                       |        |          |        |       |              |              |
|              | Pb   | 0.0060 |          | 0.0076 | µg/L  |              | 23% 20       |
| B182835-MS1  | <b>Matrix Spike, (1841053-01)</b>                    |        |          |        |       |              |              |
|              | Pb   | 0.0060 | 0.5051   | 0.4577 | µg/L  | 89% 75-125   |              |
| B182835-MSD1 | <b>Matrix Spike Duplicate, (1841053-01)</b>          |        |          |        |       |              |              |
|              | Pb   | 0.0060 | 0.5051   | 0.5420 | µg/L  | 106% 75-125  | 17% 20       |
| B182835-DUP5 | <b>Duplicate, (1841055-10)</b>                       |        |          |        |       |              |              |
|              | Cu   | 2.785  |          | 2.755  | µg/L  |              | 1% 20        |
|              | Pb   | ND     |          | ND     | µg/L  |              | N/C 20       |
| B182835-MS5  | <b>Matrix Spike, (1841055-10)</b>                    |        |          |        |       |              |              |
|              | Cu   | 2.785  | 5.051    | 7.862  | µg/L  | 101% 75-125  |              |
|              | Pb   | ND     | 5.051    | 5.454  | µg/L  | 108% 75-125  |              |
| B182835-MSD5 | <b>Matrix Spike Duplicate, (1841055-10)</b>          |        |          |        |       |              |              |
|              | Cu   | 2.785  | 5.051    | 7.611  | µg/L  | 96% 75-125   | 3% 20        |
|              | Pb   | ND     | 5.051    | 5.115  | µg/L  | 101% 75-125  | 6% 20        |



## Accuracy & Precision Summary

Batch: B182835  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182835-DUP3 | Duplicate, (1841055-20)              |        |       |        |       |              |              |
|              | Cu                                   | 3.250  |       | 3.116  | µg/L  |              | 4% 20        |
|              | Pb                                   | ND     |       | ND     | µg/L  |              | N/C 20       |
| B182835-MS3  | Matrix Spike, (1841055-20)           |        |       |        |       |              |              |
|              | Cu                                   | 3.250  | 5.051 | 8.238  | µg/L  | 99% 75-125   |              |
|              | Pb                                   | ND     | 5.051 | 5.562  | µg/L  | 110% 75-125  |              |
| B182835-MSD3 | Matrix Spike Duplicate, (1841055-20) |        |       |        |       |              |              |
|              | Cu                                   | 3.250  | 5.051 | 8.726  | µg/L  | 108% 75-125  | 6% 20        |
|              | Pb                                   | ND     | 5.051 | 5.838  | µg/L  | 116% 75-125  | 5% 20        |
| B182835-DUP4 | Duplicate, (1841055-30)              |        |       |        |       |              |              |
|              | Cu                                   | ND     |       | ND     | µg/L  |              | N/C 20       |
|              | Pb                                   | ND     |       | ND     | µg/L  |              | N/C 20       |
| B182835-MS4  | Matrix Spike, (1841055-30)           |        |       |        |       |              |              |
|              | Cu                                   | ND     | 5.051 | 4.953  | µg/L  | 98% 75-125   |              |
|              | Pb                                   | ND     | 5.051 | 5.412  | µg/L  | 107% 75-125  |              |
| B182835-MSD4 | Matrix Spike Duplicate, (1841055-30) |        |       |        |       |              |              |
|              | Cu                                   | ND     | 5.051 | 4.885  | µg/L  | 97% 75-125   | 1% 20        |
|              | Pb                                   | ND     | 5.051 | 5.354  | µg/L  | 106% 75-125  | 1% 20        |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182779  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Ni

| Sample       | Result   | Units |
|--------------|----------|-------|
| B182779-BLK1 | 0.0103   | µg/L  |
| B182779-BLK2 | 0.0102   | µg/L  |
| B182779-BLK3 | 0.0026   | µg/L  |
| B182779-BLK4 | -0.00001 | µg/L  |

**Average:** 0.0058  
**Limit:** 0.0300

**MDL:** 0.0070  
**MRL:** 0.0300

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182790  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample          | Result | Units |                            |      |
|-----------------|--------|-------|----------------------------|------|
| B182790-BLK1    | 0.15   | ng/L  |                            |      |
| B182790-BLK2    | 0.11   | ng/L  |                            |      |
| B182790-BLK3    | 0.11   | ng/L  |                            |      |
| B182790-BLK4    | 0.10   | ng/L  |                            |      |
| <b>Average:</b> | 0.12   |       | <b>Standard Deviation:</b> | 0.02 |
| <b>Limit:</b>   | 0.50   |       | <b>Limit:</b>              | 0.13 |
|                 |        |       | <b>MDL:</b>                | 0.13 |
|                 |        |       | <b>MRL:</b>                | 0.40 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
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**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182794  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** As

| Sample       | Result | Units |
|--------------|--------|-------|
| B182794-BLK1 | 0.0009 | µg/L  |
| B182794-BLK2 | 0.0008 | µg/L  |
| B182794-BLK3 | 0.0008 | µg/L  |
| B182794-BLK4 | 0.0003 | µg/L  |

**Average:** 0.001  
**Limit:** 0.040

**MDL:** 0.012  
**MRL:** 0.040

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182835  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Cu

| Sample       | Result  | Units |
|--------------|---------|-------|
| B182835-BLK1 | 0.0011  | µg/L  |
| B182835-BLK2 | 0.0004  | µg/L  |
| B182835-BLK3 | 0.0015  | µg/L  |
| B182835-BLK4 | -0.0002 | µg/L  |

**Average:** 0.0007  
**Limit:** 0.0455

**MDL:** 0.0152  
**MRL:** 0.0455

**Analyte:** Pb

| Sample       | Result  | Units |
|--------------|---------|-------|
| B182835-BLK1 | -0.0007 | µg/L  |
| B182835-BLK2 | -0.0007 | µg/L  |
| B182835-BLK3 | -0.0007 | µg/L  |
| B182835-BLK4 | -0.0007 | µg/L  |

**Average:** -0.0007  
**Limit:** 0.0152

**MDL:** 0.0051  
**MRL:** 0.0152

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1841055-01              |                             | <b>Report Matrix:</b> Water |            |                           |              | <b>Collected:</b> 10/08/2018 |                       |
|--|-----------------------------|-----------------------------|------------|---------------------------|--------------|------------------------------|-----------------------|
| <b>Sample:</b> GW-131+00-1-100818-(20) |                             | <b>Sample Type:</b> Sample  |            |                           |              | <b>Received:</b> 10/12/2018  |                       |
| <b>Des</b>                             | <b>Container</b>            | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>    |
| A                                      | FLPE - 125mL Bottle<br>Hg-T | 125 mL                      | 18-0002    | none                      | n/a          |                              | Cooler 1 -<br>1841055 |
| B                                      | Bottle HDPE ICP-W           | 250 mL                      | 17-0232    | 0.2% HNO3 (BAL)           | 17490190     | <2                           | Cooler 1 -<br>1841055 |
| C                                      | Bottle HDPE<br>ICP-ChelCol  | 125 mL                      | 18-0148    | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler 1 -<br>1841055 |

| <b>Lab ID:</b> 1841055-02              |                             | <b>Report Matrix:</b> Water |            |                           |              | <b>Collected:</b> 10/08/2018 |                       |
|--|-----------------------------|-----------------------------|------------|---------------------------|--------------|------------------------------|-----------------------|
| <b>Sample:</b> GW-131+00-2-100818-(20) |                             | <b>Sample Type:</b> Sample  |            |                           |              | <b>Received:</b> 10/12/2018  |                       |
| <b>Des</b>                             | <b>Container</b>            | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>    |
| A                                      | FLPE - 125mL Bottle<br>Hg-T | 125 mL                      | 18-0002    | none                      | n/a          |                              | Cooler 1 -<br>1841055 |
| B                                      | Bottle HDPE ICP-W           | 250 mL                      | 17-0232    | 0.2% HNO3 (BAL)           | 17490190     | <2                           | Cooler 1 -<br>1841055 |
| C                                      | Bottle HDPE<br>ICP-ChelCol  | 125 mL                      | 18-0148    | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler 1 -<br>1841055 |

| <b>Lab ID:</b> 1841055-03              |                             | <b>Report Matrix:</b> Water |            |                           |              | <b>Collected:</b> 10/08/2018 |                       |
|--|-----------------------------|-----------------------------|------------|---------------------------|--------------|------------------------------|-----------------------|
| <b>Sample:</b> GW-129+65-1-100818-(20) |                             | <b>Sample Type:</b> Sample  |            |                           |              | <b>Received:</b> 10/12/2018  |                       |
| <b>Des</b>                             | <b>Container</b>            | <b>Size</b>                 | <b>Lot</b> | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>    |
| A                                      | FLPE - 125mL Bottle<br>Hg-T | 125 mL                      | 18-0002    | none                      | n/a          |                              | Cooler 1 -<br>1841055 |
| B                                      | Bottle HDPE ICP-W           | 250 mL                      | 17-0232    | 0.2% HNO3 (BAL)           | 17490190     | <2                           | Cooler 1 -<br>1841055 |
| C                                      | Bottle HDPE<br>ICP-ChelCol  | 125 mL                      | 18-0148    | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler 1 -<br>1841055 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1841055-04              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/08/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-129+65-2-100818-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-05              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/08/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-128+30-1-100818-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-06              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/08/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-128+30-2-100818-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1841055-07              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/08/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-126+90-2-100818-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-08           |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/09/2018 |                    |
|-------------------------------------|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-6E3-2-100918-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                          | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                   | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-09              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/09/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-128+30-0-100918-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |



## Sample Containers

| <b>Lab ID:</b> 1841055-10              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/09/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-129+65-0-100918-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-11              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-126+90-0-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-12              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-125+50-0-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |





## Sample Containers

| <b>Lab ID:</b> 1841055-13              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-126+90-1-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-14              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-125+50-1-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-15              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-125+50-2-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |



## Sample Containers

| <b>Lab ID:</b> 1841055-16              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-122+60-0-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-17              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-124+00-0-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-18              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-124+00-1-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |



## Sample Containers

| <b>Lab ID:</b> 1841055-19              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-124+00-2-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-20              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/10/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-122+60-1-101018-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-21              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-124+00-0-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1841055-22              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-125+50-0-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-23              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-126+90-0-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-24              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-122+60-2-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |



## Sample Containers

| <b>Lab ID:</b> 1841055-25            |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--------------------------------------|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-5B1-1R-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                           | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                    | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                    | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-26            |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--------------------------------------|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-5B1-1R-101118-(21) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                           | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                    | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                    | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-27              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-121+80-1-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1841055-28              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-121+80-2-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-29            |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--------------------------------------|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-5B1-2R-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                           | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                    | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                    | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                    | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

| <b>Lab ID:</b> 1841055-30              |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/11/2018 |                    |
|--|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-120+75-2-101118-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                             | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                      | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler 1 - 1841055 |
| B                                      | Bottle HDPE ICP-W        | 250 mL      | 17-0232                     | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 1 - 1841055 |
| C                                      | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0148                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 1 - 1841055 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1841055  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1841055-31           |                          | <b>Report Matrix:</b> Water      |            |                        |              | <b>Collected:</b> 10/12/2018 |                    |
|-------------------------------------|--------------------------|----------------------------------|------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-EB-EB-101218-(20) |                          | <b>Sample Type:</b> Equip. Blank |            |                        |              | <b>Received:</b> 10/12/2018  |                    |
| <b>Des</b>                          | <b>Container</b>         | <b>Size</b>                      | <b>Lot</b> | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | FLPE - 125mL Bottle Hg-T | 125 mL                           | 18-0002    | none                   | n/a          |                              | Cooler 2 - 1841055 |
| B                                   | Bottle HDPE ICP-W        | 250 mL                           | 17-0232    | 0.2% HNO3 (BAL)        | 17490190     | <2                           | Cooler 2 - 1841055 |
| C                                   | Bottle HDPE ICP-ChelCol  | 125 mL                           | 18-0148    | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler 2 - 1841055 |

## Shipping Containers

### Cooler 1 - 1841055

**Received:** October 12, 2018 12:45  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 3.0 °C

**Description:** Cooler 1  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes

### Cooler 2 - 1841055

**Received:** October 12, 2018 12:45  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Ice  
**Temperature:** 4.8 °C

**Description:** Cooler 2  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes





# Chain-of-Custody Form

BAL Report 1841055

Received by: [Signature] For BAL use only Date: 10/12/18  
 Work Order ID: 1841055 Time: 12:45  
 Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)<br><input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Collection              |                       | Client Sample Info |                      |                 |                                 | BAL Analyses Required  |   |   |                                      |   |             | Comments<br><br>Specify Here |  |              |
|---|-------------------------|-----------------------|--------------------|----------------------|-----------------|---------------------------------|--|---|---|--------------------------------------|---|-------------|------------------------------|--|--------------|
|   | Date                    | Time                  | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type               | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |   |             |                              |  |              |
| Sample ID   |                         |                       |                    |                      |                 |                                 |  |   |   |                                      |   |             |                              |  |              |
| 1   | GW-131+00-1-100818-(20) | 10/8/18               | 0930               | WATER                | 3               | Y                               | -  |   |   | X                                    | ✓ |             |                              |  | 34,090 µS/cm |
| 2   | GW-131+00-2-100818-(20) | 10/8/18               | 1200               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 13,315 µS/cm |
| 3   | GW-129+65-1-100818-(20) | 10/8/18               | 0940               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 33,217 µS/cm |
| 4   | GW-129+65-2-100818-(20) | 10/8/18               | 1015               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 26,500 µS/cm |
| 5   | GW-128+30-1-100818-(20) | 10/8/18               | 1230               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 37,838 µS/cm |
| 6   | GW-128+30-2-100818-(20) | 10/8/18               | 1400               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 18,140 µS/cm |
| 7   | GW-126+90-2-100818-(20) | 10/8/18               | 1420               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 28,157 µS/cm |
| 8   | GW-6E3-2-100918-(20)    | 10/9/18               | 1330               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 37,194 µS/cm |
| 9   | GW-128+30-0-100918-(20) | 10/9/18               | 1000               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 39,278 µS/cm |
| 10  | GW-129+65-0-100918-(20) | 10/9/18               | 1030               |                      |                 |                                 |  |   |   | X                                    | ✓ |             |                              |  | 29,216 µS/cm |
| Trip Blank (specify)  |                         |                       |                    |                      |                 |                                 |  |   |   |                                      |   |             |                              |  |              |
| Relinquished By: <u>[Signature]</u>   |                         | Date: <u>10/12/18</u> |                    | Time: <u>12:45</u>   |                 | Relinquished By: _____          |  |   |   | Date: _____                          |   | Time: _____ |                              |  |              |
| Received By: _____  |                         | Date: _____           |                    | Time: _____          |                 | Total Number of Packages: _____ |  |   |   |                                      |   |             |                              |  |              |

Print





# Chain-of-Custody Form

BAL Report 1841055

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: S. Long For BAL use only Date: 10/12/18

Work Order ID: \_\_\_\_\_ Time: 12:45

Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF)

PO Number: 79224

Contact: Troy Bussey (PIONEER)

Phone: 360-570-1700

Client Project ID: Arkema FS DG Inv

Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Mail Invoice to:

Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to:

Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes

BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection               |                    | Client Sample Info        |                      |                 |                   | BAL Analyses Required   |  |   |                                      |   | Comments |  |                               |
|--|--------------------------|--------------------|---------------------------|----------------------|-----------------|-------------------|---|--|---|--------------------------------------|---|----------|--|-------------------------------|
|  | Date                     | Time               | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solids: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solids: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |   |          |  |                               |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Specify Here             |                    |                           |                      |                 |                   |   |  |   |                                      |   |          |  |                               |
| Sample ID  |                          |                    |                           |                      |                 |                   |   |  |   |                                      |   |          |  |                               |
| 1  | GW-124+90-0-1010-18-(20) | 10/10/18           | 1000                      | W                    | 3               | ✓                 | -   |  |   | X                                    | ✓ |          |  | 36721 $\mu\text{S}/\text{cm}$ |
| 2  | GW-125+50-0-1010-18-(20) |                    | 1015                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 30457 $\mu\text{S}/\text{cm}$ |
| 3  | GW-126+90-1-1010-18-(20) |                    | 1045                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 40957 $\mu\text{S}/\text{cm}$ |
| 4  | GW-125+50-1-1010-18-(20) |                    | 1200                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 38238 $\mu\text{S}/\text{cm}$ |
| 5  | GW-125+50-2-1010-18-(20) |                    | 1210                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 29440 $\mu\text{S}/\text{cm}$ |
| 6  | GW-122+60-0-1010-18-(20) |                    | 1245                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 27375 $\mu\text{S}/\text{cm}$ |
| 7  | GW-124+00-0-1010-18-(20) |                    | 1300                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 38590 $\mu\text{S}/\text{cm}$ |
| 8  | GW-124+00-1-1010-18-(20) |                    | 1340                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 37297 $\mu\text{S}/\text{cm}$ |
| 9  | GW-124+00-2-1010-18-(20) |                    | 1405                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 31580 $\mu\text{S}/\text{cm}$ |
| 10   | GW-122+60-1-1010-18-(20) |                    | 1350                      |                      |                 |                   |   |  |   | X                                    | ✓ |          |  | 30234 $\mu\text{S}/\text{cm}$ |
| Trip Blank (specify)   |                          |                    |                           |                      |                 |                   |   |  |   |                                      |   |          |  |                               |
| Relinquished By: <u>[Signature]</u>  | Date: <u>10/12/18</u>    | Time: <u>12:45</u> | Relinquished By:          |                      |                 |                   | Date:   | Time:  |   |                                      |   |          |  |                               |
| Received By:   | Date:                    | Time:              | Total Number of Packages: |                      |                 |                   |   |  |   |                                      |   |          |  |                               |

Print



# Chain-of-Custody Form

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

Received by: Sherry For BAL use only Date: 10/12/18  
 Work Order ID: \_\_\_\_\_ Time: 12:45  
 Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |             | Client Sample Info              |                      |                 |                   | BAL Analyses Required  |   |   |                                      |  |  | Comments |                   |
|--|---|-------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|--------------------------------------|--|--|----------|-------------------|
|  | Date                                    | Time        | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |  |  |          |                   |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |             |                                 |                      |                 |                   |  |   |   |                                      |  |  |          |                   |
| Sample ID  |   |             |                                 |                      |                 |                   |  |   |   |                                      |  |  |          | Specify Here      |
| 1 GW-124+00-0-1011-18-(26)   | 10/11/18                                | 0930        | W                               | 3                    | Y               | -                 |  |   | X   | ✓                                    |  |  |          | 32356 $\mu$ S/cm. |
| 2 GW-125+50-0-1011-18-(20)   |   | 0915        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 38521 $\mu$ S/cm  |
| 3 GW-126+90-0-1011-18-(20)   |   | 0900        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 28189 $\mu$ S/cm  |
| 4 GW-122+60-2-1011-18-(20)   |   | 1200        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 29764 $\mu$ S/cm  |
| 5 GW-5B1-1R-1011-18-(20)   |   | 1310        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 2709 $\mu$ S/cm.  |
| 6 GW-5B1-1R-1011-18-(21)   |   | 1315        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 2709 $\mu$ S/cm.  |
| 7 GW-121+80-1-1011-18-(20)   |   | 1430        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 6138 $\mu$ S/cm.  |
| 8 GW-121+80-2-1011-18-(20)   |   | 1400        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 11455 $\mu$ S/cm. |
| 9 GW-5B1-2R-1011-18-(20)   |   | 1345        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 42316 $\mu$ S/cm. |
| 10 GW-120+75-2-1011-18-(20)  |   | 1430        |                                 |                      |                 |                   |  |   | X   | ✓                                    |  |  |          | 37464 $\mu$ S/cm. |
| Trip Blank (specify)   |   |             |                                 |                      |                 |                   |  |   |   |                                      |  |  |          |                   |
| Relinquished By: <u>[Signature]</u>  | Date: 10/12/18                          | Time: 1245  | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |                                      |  |  |          |                   |
| Received By: _____   | Date: _____                             | Time: _____ | Total Number of Packages: _____ |                      |                 |                   |  |   |   |                                      |  |  |          |                   |



# Chain-of-Custody Form

BAL Report 1841055

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: Sherry For BAL use only Date: 10/12/18  
Work Order ID: \_\_\_\_\_ Time: 12:45  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection             |                   | Client Sample Info              |                      |                 |                   | BAL Analyses Required  |   |   |                                      |   | Comments |              |
|--|------------------------|-------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|--------------------------------------|---|----------|--------------|
|  | Date                   | Time              | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |   |          |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID              |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 1  | GW-EB-EB-10/12/18-(20) | 10/12/18          | 0930                            | W                    | 3               | Y                 | (  |   |   | X                                    | ✓ |          | Specify Here |
| 2  |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 3  |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 4  |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 5  |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 6  |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 7  |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 8  |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 9  |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| 10   |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| Trip Blank (specify)   |                        |                   |                                 |                      |                 |                   |  |   |   |                                      |   |          |              |
| Relinquished By: <u>[Signature]</u>  | Date: <u>10/12/18</u>  | Time: <u>1245</u> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |                                      |   |          |              |
| Received By: _____   | Date: _____            | Time: _____       | Total Number of Packages: _____ |                      |                 |                   |  |   |   |                                      |   |          |              |



Cooler 1

No CS

CEL ✓

3.0°C TR # 15 re

125 mL HDPE (low level) 18-0148 CC

250 mL HDPE 17-0232 TM

125 mL HDPE 18-0002 Hz

Cooler 2

No CS

COE ✓

4.8 °C IR # 15 02e

125 mL HDPE (low level) 18-0148 CC

250 mL HDPE 17-0232 TM

125 mL FLPE 18-0002 Hg



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 28, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Dear Mr. Bussey,

On October 18, 2018, Brooks Applied Labs (BAL) received eighteen (18) water samples in two sealed containers with temperatures of 22.0°C (Cooler #1) and 4.5°C (Cooler #2). The samples were logged-in for dissolved arsenic [As] analyses via digestion and subsequent analysis by modified EPA Method 1638. The samples were logged in for dissolved (copper [Cu], lead [Pb], and nickel [Ni]) analyses by modified EPA Method 1640. The samples were logged-in for the dissolved mercury [Hg] analysis by EPA Method 1631E, according to the chain-of-custody (COC) forms.

The samples submitted for dissolved analyses were filtered in the field by the client.

Typically, containers sent out for EPA 1368 analyses are different than containers provided for EPA 1640 analyses. The containers are the same material & size. However, EPA 1640 containers are lot tested to a lower MRL to support the lower MDL/MRLs boasted by EPA 1640. For the bottle order sent out to support this work order, containers from lot 18-0189 were mistakenly provided for both 1638 and 1640 sampling. The containers in lot 18-0189 were initially lot tested to 1638 criteria, not 1640. The analytical run used for the lot testing was inspected and it was determined that lot 18-0189 passes for Cu, Ni, and Pb using the lower, EPA 1640 criteria. A formal certificate of analysis has been provided for lot 18-0189, demonstrating that these containers are appropriate for EPA 1640Mod use. The use of lot 18-0189 containers should have no impact on data quality.

All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology. Reagent water for dilutions and sample preservatives was monitored for contamination to account for any biases associated with the sample results.

*Dissolved Metals (As) Analysis by EPA Method 1638, Mod.*

The original bottles were preserved with 1% HNO<sub>3</sub> (v/v) and 1% HCl (v/v). All sample fractions for dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Dissolved arsenic quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

**Batch B182855**

Arsenic results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

**Batch B183038**

Arsenic results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration for most analytes. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

*Dissolved metals (Cu, Ni, and Pb) Analysis by EPA Method 1640, Mod.*

Samples for column chelation were pH adjusted with 0.2% (v/v) nitric acid (HNO<sub>3</sub>) and then prepared according to EPA Method 1640. All sample fractions for dissolved metals analyses were digested in the original sample containers in a laboratory oven for a minimum of 3 hours at 85°C.

Aliquots of prepared sample were analyzed via inductively coupled plasma dynamic reaction cell mass spectrometry (ICP-DRC-MS). The ICP-DRC-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

**Batch B182856**

The matrix spike recoveries for copper and nickel in B182856-MS2 were greater than upper control limit of 125%, at 130% and 129%, respectively. This matrix spike recoveries were elevated for all analytes compared to B182856-MSD2. Since it is not possible to determine if the high recoveries in B182856-MS2 were the result a spiking error or not, the copper and nickel results for the source sample 1842044-17 should be considered estimated and have been qualified "N".

The copper, nickel, and lead results for the equipment blank sample, 1842044-18, were greater than the associated MRL values. Re-analyses confirmed the results over the MRL. Results from the initial analyses are reported.

The nickel result for the closing method blank, identified as B182856-BLK4, is a statistical outlier according to the Grubb's Test. Re-analysis confirmed the elevated blank. Client sample results less than 10 times the method blank outlier are qualified "X" to indicate a potential high bias. Nickel results for the client samples 1842044-02, 1842044-06, 1842044-07, 1842044-09, 1842044-10, 1842044-17, and 1842044-18 have are impacted.

Dissolved metals results were not method blank corrected as described in the calculations section of the relevant BAL SOP and were evaluated using reporting limits adjusted to account for sample aliquot size. The MRL is set by a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Dissolved Mercury Quantitation by EPA Method 1631E

All samples are prepared and analyzed in accordance with EPA Method 1631. Samples are oxidized with bromine monochloride (BrCl) and then analyzed with stannous chloride ( $\text{SnCl}_2$ ) reduction, dual gold amalgamation, and cold vapor atomic fluorescence spectroscopy (CVAFS) detection using a Brooks Rand Instrument's MERX-T CVAFS Mercury Automated-Analyzer.

#### **Batch B182830**

The matrix spike duplicate recovery for mercury in B182830-MSD1 was greater than upper control limit of 125%, at 132%. The mercury result for the source sample 1842044-05 should be considered estimated and has been qualified "N" to reflect the discrepancy. The mercury result for 1842044-05 has been qualified as estimated "M" due to the elevated MS/MSD RPD value.

The mercury results were method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,



Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs  
Jeremy@brooksapplied.com





## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Please see narrative for explanation.                                      |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.                               |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Please see narrative for explanation.  |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample                       | Lab ID     | Report Matrix | Type         | Sampled    | Received   |
|------------------------------|------------|---------------|--------------|------------|------------|
| PW-119+25-0-DS-101718-(20)   | 1842044-01 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-119+25-ST1-DS-101718-(20) | 1842044-02 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-120+75-0-DS-101718-(20)   | 1842044-03 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-120+75-ST1-DS-101718-(20) | 1842044-04 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-122+60-0-DS-101718-(20)   | 1842044-05 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-123+25-ST1-DS-101718-(20) | 1842044-06 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-123+25-ST1-DS-101718-(21) | 1842044-07 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-124+00-0-DS-101718-(20)   | 1842044-08 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| SW-128+50-SW-DS-101718-(20)  | 1842044-09 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| SW-120+75-SW-DS-101718-(20)  | 1842044-10 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-125+00-ST1-DS-101718-(20) | 1842044-11 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| SW-125+00-SW-DS-101718-(20)  | 1842044-12 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-125+50-0-DS-101718-(20)   | 1842044-13 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-126+80-ST1-DS-101718-(20) | 1842044-14 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-126+90-0-DS-101718-(20)   | 1842044-15 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-128+30-0-DS-101718-(20)   | 1842044-16 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| PW-128+50-ST1-DS-101718-(20) | 1842044-17 | Water         | Sample       | 10/17/2018 | 10/18/2018 |
| EB-EB-101718-(20)            | 1842044-18 | Water         | Equip. Blank | 10/17/2018 | 10/18/2018 |

## Batch Summary

| Analyte | Lab Matrix | Method          | Prepared   | Analyzed   | Batch   | Sequence |
|---------|------------|-----------------|------------|------------|---------|----------|
| As      | Water      | EPA 1638 Mod    | 10/24/2018 | 11/02/2018 | B182855 | 1801476  |
| As      | Water      | EPA 1638 Mod    | 10/24/2018 | 11/10/2018 | B183038 | 1801521  |
| Cu      | Water      | EPA 1640 Column | 10/24/2018 | 11/16/2018 | B182856 | 1801555  |
| Hg      | Water      | EPA 1631 E      | 10/23/2018 | 10/26/2018 | B182830 | 1801454  |
| Ni      | Water      | EPA 1640 Column | 10/24/2018 | 11/16/2018 | B182856 | 1801555  |
| Pb      | Water      | EPA 1640 Column | 10/24/2018 | 11/16/2018 | B182856 | 1801555  |



## Sample Results

| Sample                              | Analyte | Report Matrix | Basis | Result | Qualifier | MDL    | MRL    | Unit | Batch   | Sequence |
|-------------------------------------|---------|---------------|-------|--------|-----------|--------|--------|------|---------|----------|
| <b>PW-119+25-0-DS-101718-(20)</b>   |         |               |       |        |           |        |        |      |         |          |
| 1842044-01                          | As      | Water         | D     | 2.79   |           | 0.490  | 1.63   | µg/L | B183038 | 1801521  |
| 1842044-01                          | Cu      | Water         | D     | 1.27   |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-01                          | Hg      | Water         | D     | ≤ 0.13 | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-01                          | Ni      | Water         | D     | 1.60   |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-01                          | Pb      | Water         | D     | 0.0774 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-119+25-ST1-DS-101718-(20)</b> |         |               |       |        |           |        |        |      |         |          |
| 1842044-02                          | As      | Water         | D     | 33.2   |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-02                          | Cu      | Water         | D     | 0.146  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-02                          | Hg      | Water         | D     | ≤ 0.13 | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-02                          | Ni      | Water         | D     | 0.336  | X         | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-02                          | Pb      | Water         | D     | 0.0134 | J         | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-120+75-0-DS-101718-(20)</b>   |         |               |       |        |           |        |        |      |         |          |
| 1842044-03                          | As      | Water         | D     | 4.20   |           | 0.490  | 1.63   | µg/L | B183038 | 1801521  |
| 1842044-03                          | Cu      | Water         | D     | 2.78   |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-03                          | Hg      | Water         | D     | 0.17   | J         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-03                          | Ni      | Water         | D     | 1.02   |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-03                          | Pb      | Water         | D     | 0.0843 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-120+75-ST1-DS-101718-(20)</b> |         |               |       |        |           |        |        |      |         |          |
| 1842044-04                          | As      | Water         | D     | 32.0   |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-04                          | Cu      | Water         | D     | 0.344  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-04                          | Hg      | Water         | D     | ≤ 0.13 | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-04                          | Ni      | Water         | D     | 0.729  |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-04                          | Pb      | Water         | D     | 0.0574 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-122+60-0-DS-101718-(20)</b>   |         |               |       |        |           |        |        |      |         |          |
| 1842044-05                          | As      | Water         | D     | 12.9   |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-05                          | Cu      | Water         | D     | 0.356  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-05                          | Hg      | Water         | D     | 0.71   | M N       | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-05                          | Ni      | Water         | D     | 12.3   |           | 0.0707 | 0.303  | µg/L | B182856 | 1801555  |
| 1842044-05                          | Pb      | Water         | D     | 0.0300 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |



## Sample Results

| Sample                              | Analyte | Report Matrix | Basis | Result | Qualifier | MDL    | MRL    | Unit | Batch   | Sequence |
|-------------------------------------|---------|---------------|-------|--------|-----------|--------|--------|------|---------|----------|
| <b>PW-123+25-ST1-DS-101718-(20)</b> |         |               |       |        |           |        |        |      |         |          |
| 1842044-06                          | As      | Water         | D     | 529    |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-06                          | Cu      | Water         | D     | 0.180  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-06                          | Hg      | Water         | D     | 0.47   |           | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-06                          | Ni      | Water         | D     | 0.462  | X         | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-06                          | Pb      | Water         | D     | 0.0114 | J         | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-123+25-ST1-DS-101718-(21)</b> |         |               |       |        |           |        |        |      |         |          |
| 1842044-07                          | As      | Water         | D     | 564    |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-07                          | Cu      | Water         | D     | 0.152  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-07                          | Hg      | Water         | D     | 0.22   | J         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-07                          | Ni      | Water         | D     | 0.412  | X         | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-07                          | Pb      | Water         | D     | 0.0110 | J         | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-124+00-0-DS-101718-(20)</b>   |         |               |       |        |           |        |        |      |         |          |
| 1842044-08                          | As      | Water         | D     | 4.96   |           | 0.490  | 1.63   | µg/L | B183038 | 1801521  |
| 1842044-08                          | Cu      | Water         | D     | 2.19   |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-08                          | Hg      | Water         | D     | 0.36   | J         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-08                          | Ni      | Water         | D     | 1.04   |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-08                          | Pb      | Water         | D     | 0.0825 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>SW-128+50-SW-DS-101718-(20)</b>  |         |               |       |        |           |        |        |      |         |          |
| 1842044-09                          | As      | Water         | D     | 2.44   |           | 0.490  | 1.63   | µg/L | B183038 | 1801521  |
| 1842044-09                          | Cu      | Water         | D     | 0.902  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-09                          | Hg      | Water         | D     | ≤ 0.13 | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-09                          | Ni      | Water         | D     | 0.430  | X         | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-09                          | Pb      | Water         | D     | 0.0606 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>SW-120+75-SW-DS-101718-(20)</b>  |         |               |       |        |           |        |        |      |         |          |
| 1842044-10                          | As      | Water         | D     | 3.78   |           | 0.490  | 1.63   | µg/L | B183038 | 1801521  |
| 1842044-10                          | Cu      | Water         | D     | 1.12   |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-10                          | Hg      | Water         | D     | ≤ 0.13 | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-10                          | Ni      | Water         | D     | 0.531  | X         | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-10                          | Pb      | Water         | D     | 0.0817 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |



## Sample Results

| Sample                              | Analyte | Report Matrix | Basis | Result | Qualifier | MDL    | MRL    | Unit | Batch   | Sequence |
|-------------------------------------|---------|---------------|-------|--------|-----------|--------|--------|------|---------|----------|
| <b>PW-125+00-ST1-DS-101718-(20)</b> |         |               |       |        |           |        |        |      |         |          |
| 1842044-11                          | As      | Water         | D     | 43.5   |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-11                          | Cu      | Water         | D     | 0.382  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-11                          | Hg      | Water         | D     | ≤ 0.13 | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-11                          | Ni      | Water         | D     | 0.791  |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-11                          | Pb      | Water         | D     | 0.0433 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>SW-125+00-SW-DS-101718-(20)</b>  |         |               |       |        |           |        |        |      |         |          |
| 1842044-12                          | As      | Water         | D     | 2.70   |           | 0.490  | 1.63   | µg/L | B183038 | 1801521  |
| 1842044-12                          | Cu      | Water         | D     | 0.966  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-12                          | Hg      | Water         | D     | ≤ 0.13 | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-12                          | Ni      | Water         | D     | 0.587  |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-12                          | Pb      | Water         | D     | 0.0918 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-125+50-0-DS-101718-(20)</b>   |         |               |       |        |           |        |        |      |         |          |
| 1842044-13                          | As      | Water         | D     | 43.7   |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-13                          | Cu      | Water         | D     | 1.81   |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-13                          | Hg      | Water         | D     | 0.56   |           | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-13                          | Ni      | Water         | D     | 2.93   |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-13                          | Pb      | Water         | D     | 0.0773 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-126+80-ST1-DS-101718-(20)</b> |         |               |       |        |           |        |        |      |         |          |
| 1842044-14                          | As      | Water         | D     | 15.2   |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-14                          | Cu      | Water         | D     | 0.644  |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-14                          | Hg      | Water         | D     | ≤ 0.13 | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-14                          | Ni      | Water         | D     | 0.646  |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-14                          | Pb      | Water         | D     | 0.0231 |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-126+90-0-DS-101718-(20)</b>   |         |               |       |        |           |        |        |      |         |          |
| 1842044-15                          | As      | Water         | D     | 30.9   |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-15                          | Cu      | Water         | D     | 2.60   |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-15                          | Hg      | Water         | D     | 0.46   |           | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-15                          | Ni      | Water         | D     | 1.44   |           | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-15                          | Pb      | Water         | D     | 0.363  |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |



## Sample Results

| Sample                              | Analyte | Report Matrix | Basis | Result  | Qualifier | MDL    | MRL    | Unit | Batch   | Sequence |
|-------------------------------------|---------|---------------|-------|---------|-----------|--------|--------|------|---------|----------|
| <b>PW-128+30-0-DS-101718-(20)</b>   |         |               |       |         |           |        |        |      |         |          |
| 1842044-16                          | As      | Water         | D     | 8.81    |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-16                          | Cu      | Water         | D     | 1.88    |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-16                          | Hg      | Water         | D     | 0.50    |           | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-16                          | Ni      | Water         | D     | 7.70    |           | 0.0707 | 0.303  | µg/L | B182856 | 1801555  |
| 1842044-16                          | Pb      | Water         | D     | 0.214   |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>PW-128+50-ST1-DS-101718-(20)</b> |         |               |       |         |           |        |        |      |         |          |
| 1842044-17                          | As      | Water         | D     | 35.0    |           | 2.86   | 5.71   | µg/L | B182855 | 1801476  |
| 1842044-17                          | Cu      | Water         | D     | 0.121   | N         | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-17                          | Hg      | Water         | D     | 0.15    | J         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-17                          | Ni      | Water         | D     | 0.363   | N X       | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-17                          | Pb      | Water         | D     | 0.0095  | J         | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |
| <b>EB-EB-101718-(20)</b>            |         |               |       |         |           |        |        |      |         |          |
| 1842044-18                          | As      | Water         | D     | ≤ 0.012 | U         | 0.012  | 0.041  | µg/L | B183038 | 1801521  |
| 1842044-18                          | Cu      | Water         | D     | 0.242   |           | 0.0152 | 0.0455 | µg/L | B182856 | 1801555  |
| 1842044-18                          | Hg      | Water         | D     | ≤ 0.13  | U         | 0.13   | 0.41   | ng/L | B182830 | 1801454  |
| 1842044-18                          | Ni      | Water         | D     | 0.370   | X         | 0.0071 | 0.0303 | µg/L | B182856 | 1801555  |
| 1842044-18                          | Pb      | Water         | D     | 0.0453  |           | 0.0051 | 0.0152 | µg/L | B182856 | 1801555  |



## Accuracy & Precision Summary

Batch: B182830  
 Lab Matrix: Water  
 Method: EPA 1631 E

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182830-SRM1 | Standard Reference Material (1841003, THg SRM NIST 1641d)<br>Hg |        | 1568  | 1588   | ng/L  | 101% 80-120  |              |
| B182830-MS1  | Matrix Spike (1842044-05)<br>Hg                                 | 0.71   | 4.082 | 4.64   | ng/L  | 96% 71-125   |              |
| B182830-MSD1 | Matrix Spike Duplicate (1842044-05)<br>Hg                       | 0.71   | 4.082 | 6.08   | ng/L  | 132% 71-125  | 27% 24       |
| B182830-MS2  | Matrix Spike (1842044-13)<br>Hg                                 | 0.56   | 4.082 | 3.91   | ng/L  | 82% 71-125   |              |
| B182830-MSD2 | Matrix Spike Duplicate (1842044-13)<br>Hg                       | 0.56   | 4.082 | 4.45   | ng/L  | 95% 71-125   | 13% 24       |





## Accuracy & Precision Summary

Batch: B182855  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182855-BS1  | Blank Spike, (1843053)<br>As  |        | 20.00 | 22.09  | µg/L  | 110% 75-125  |              |
| B182855-SRM1 | Standard Reference Material (1841074, T221 as SRM)<br>As            |        | 17.70 | 17.71  | µg/L  | 100% 75-125  |              |
| B182855-SRM2 | Standard Reference Material (1836081, NIST 1643f (Batch SRM))<br>As |        | 57.42 | 57.13  | µg/L  | 99% 75-125   |              |
| B182855-DUP2 | Duplicate, (1842044-11)<br>As                                       | 43.45  |       | 43.78  | µg/L  |              | 0.8% 20      |
| B182855-MS2  | Matrix Spike, (1842044-11)<br>As                                    | 43.45  | 408.2 | 497.2  | µg/L  | 111% 75-125  |              |
| B182855-MSD2 | Matrix Spike Duplicate, (1842044-11)<br>As                          | 43.45  | 408.2 | 493.3  | µg/L  | 110% 75-125  | 0.8% 20      |





## Accuracy & Precision Summary

Batch: B182856  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte  | Native | Spike    | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|----------|--------|-------|--------------|--------------|
| B182856-BS2  | <b>Blank Spike, (1825037)</b>                        |        |          |        |       |              |              |
|              | Cu   |        | 0.5000   | 0.5879 | µg/L  | 118% 75-125  |              |
|              | Ni   |        | 0.5000   | 0.5786 | µg/L  | 116% 75-125  |              |
|              | Pb   |        | 0.5000   | 0.4997 | µg/L  | 100% 75-125  |              |
| B182856-SRM1 | <b>Standard Reference Material (1741024, NASS-7)</b> |        |          |        |       |              |              |
|              | Cu   |        | 0.1990   | 0.2221 | µg/L  | 112% 75-125  |              |
|              | Ni   |        | 0.2480   | 0.2592 | µg/L  | 104% 75-125  |              |
| B182856-SRM2 | <b>Standard Reference Material (1808030, SLEW-3)</b> |        |          |        |       |              |              |
|              | Cu   |        | 1.550    | 1.814  | µg/L  | 117% 70-130  |              |
|              | Ni   |        | 1.230    | 1.433  | µg/L  | 116% 70-130  |              |
|              | Pb   |        | 0.009000 | 0.0078 | µg/L  | 87% 70-130   |              |
| B182856-DUP1 | <b>Duplicate, (1842044-06)</b>                       |        |          |        |       |              |              |
|              | Cu   | 0.1801 |          | 0.1829 | µg/L  |              | 2% 20        |
|              | Ni   | 0.4620 |          | 0.4438 | µg/L  |              | 4% 20        |
|              | Pb   | 0.0114 |          | 0.0116 | µg/L  |              | 1% 20        |
| B182856-MS1  | <b>Matrix Spike, (1842044-06)</b>                    |        |          |        |       |              |              |
|              | Cu   | 0.1801 | 0.5051   | 0.6962 | µg/L  | 102% 75-125  |              |
|              | Ni   | 0.4620 | 0.5051   | 0.9076 | µg/L  | 88% 75-125   |              |
|              | Pb   | 0.0114 | 0.5051   | 0.5303 | µg/L  | 103% 75-125  |              |
| B182856-MSD1 | <b>Matrix Spike Duplicate, (1842044-06)</b>          |        |          |        |       |              |              |
|              | Cu   | 0.1801 | 0.5051   | 0.7103 | µg/L  | 105% 75-125  | 2% 20        |
|              | Ni   | 0.4620 | 0.5051   | 0.9284 | µg/L  | 92% 75-125   | 2% 20        |
|              | Pb   | 0.0114 | 0.5051   | 0.5382 | µg/L  | 104% 75-125  | 1% 20        |
| B182856-DUP3 | <b>Duplicate, (1842044-16)</b>                       |        |          |        |       |              |              |
|              | Ni   | 7.696  |          | 7.837  | µg/L  |              | 2% 20        |
| B182856-MS3  | <b>Matrix Spike, (1842044-16)</b>                    |        |          |        |       |              |              |
|              | Ni   | 7.696  | 5.051    | 13.47  | µg/L  | 114% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182856  
 Lab Matrix: Water  
 Method: EPA 1640 Column

| Sample       | Analyte                                     | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|--------|--------|-------|--------------|--------------|
| B182856-MSD3 | <b>Matrix Spike Duplicate, (1842044-16)</b> |        |        |        |       |              |              |
|              | Ni  | 7.696  | 5.051  | 13.72  | µg/L  | 119% 75-125  | 2% 20        |
| B182856-DUP2 | <b>Duplicate, (1842044-17)</b>              |        |        |        |       |              |              |
|              | Cu  | 0.1209 |        | 0.1192 | µg/L  |              | 1% 20        |
|              | Ni  | 0.3630 |        | 0.3596 | µg/L  |              | 1% 20        |
|              | Pb  | 0.0095 |        | 0.0095 | µg/L  |              | 0.3% 20      |
| B182856-MS2  | <b>Matrix Spike, (1842044-17)</b>           |        |        |        |       |              |              |
|              | Cu  | 0.1209 | 0.5051 | 0.7753 | µg/L  | 130% 75-125  |              |
|              | Ni  | 0.3630 | 0.5051 | 1.017  | µg/L  | 129% 75-125  |              |
|              | Pb  | 0.0095 | 0.5051 | 0.5898 | µg/L  | 115% 75-125  |              |
| B182856-MSD2 | <b>Matrix Spike Duplicate, (1842044-17)</b> |        |        |        |       |              |              |
|              | Cu  | 0.1209 | 0.5051 | 0.6814 | µg/L  | 111% 75-125  | 13% 20       |
|              | Ni  | 0.3630 | 0.5051 | 0.8952 | µg/L  | 105% 75-125  | 13% 20       |
|              | Pb  | 0.0095 | 0.5051 | 0.5081 | µg/L  | 99% 75-125   | 15% 20       |



## Accuracy & Precision Summary

Batch: B183038  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B183038-BS1  | Blank Spike, (1843053)<br>As  |        | 20.00 | 20.40  | µg/L  | 102% 75-125  |              |
| B183038-SRM1 | Standard Reference Material (1841074, T221 as SRM)<br>As            |        | 17.70 | 18.96  | µg/L  | 107% 75-125  |              |
| B183038-SRM2 | Standard Reference Material (1836081, NIST 1643f (Batch SRM))<br>As |        | 57.42 | 60.17  | µg/L  | 105% 75-125  |              |
| B183038-DUP1 | Duplicate, (1842044-12)<br>As                                       | 2.696  |       | 2.652  | µg/L  |              | 2% 20        |
| B183038-MS1  | Matrix Spike, (1842044-12)<br>As                                    | 2.696  | 408.2 | 507.0  | µg/L  | 124% 75-125  |              |
| B183038-MSD1 | Matrix Spike Duplicate, (1842044-12)<br>As                          | 2.696  | 408.2 | 502.4  | µg/L  | 122% 75-125  | 0.9% 20      |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182830  
**Matrix:** Water  
**Method:** EPA 1631 E  
**Analyte:** Hg

| Sample          | Result | Units |                            |      |
|-----------------|--------|-------|----------------------------|------|
| B182830-BLK1    | 0.14   | ng/L  |                            |      |
| B182830-BLK2    | 0.16   | ng/L  |                            |      |
| B182830-BLK3    | 0.14   | ng/L  |                            |      |
| B182830-BLK4    | 0.13   | ng/L  |                            |      |
| <b>Average:</b> | 0.14   |       | <b>Standard Deviation:</b> | 0.01 |
| <b>Limit:</b>   | 0.50   |       | <b>Limit:</b>              | 0.13 |
|                 |        |       | <b>MDL:</b>                | 0.13 |
|                 |        |       | <b>MRL:</b>                | 0.40 |

**Project ID:** PTC-OA1701  
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BAL Report 1842044  
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## Method Blanks & Reporting Limits

**Batch:** B182855  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** As

| Sample       | Result | Units |
|--------------|--------|-------|
| B182855-BLK1 | 0.060  | µg/L  |
| B182855-BLK2 | 0.057  | µg/L  |
| B182855-BLK3 | 0.056  | µg/L  |
| B182855-BLK4 | 0.050  | µg/L  |

**Average:** 0.056  
**Limit:** 0.140

**MDL:** 0.070  
**MRL:** 0.140



## Method Blanks & Reporting Limits

**Batch:** B182856  
**Matrix:** Water  
**Method:** EPA 1640 Column  
**Analyte:** Cu

| Sample          | Result | Units |                    |
|-----------------|--------|-------|--------------------|
| B182856-BLK1    | 0.0044 | µg/L  |                    |
| B182856-BLK2    | 0.0028 | µg/L  |                    |
| B182856-BLK3    | 0.0086 | µg/L  |                    |
| B182856-BLK4    | 0.0044 | µg/L  |                    |
| <b>Average:</b> | 0.0051 |       | <b>MDL:</b> 0.0150 |
| <b>Limit:</b>   | 0.0450 |       | <b>MRL:</b> 0.0450 |

**Analyte:** Ni

| Sample          | Result | Units |                    |
|-----------------|--------|-------|--------------------|
| B182856-BLK1    | 0.0041 | µg/L  |                    |
| B182856-BLK2    | 0.0054 | µg/L  |                    |
| B182856-BLK3    | 0.0099 | µg/L  |                    |
| B182856-BLK4    | 0.0531 | µg/L  |                    |
| <b>Average:</b> | 0.0181 |       | <b>MDL:</b> 0.0070 |
| <b>Limit:</b>   | 0.0300 |       | <b>MRL:</b> 0.0300 |

**Analyte:** Pb

| Sample          | Result  | Units |                    |
|-----------------|---------|-------|--------------------|
| B182856-BLK1    | 0.00004 | µg/L  |                    |
| B182856-BLK2    | 0.00004 | µg/L  |                    |
| B182856-BLK3    | 0.00003 | µg/L  |                    |
| B182856-BLK4    | 0.00006 | µg/L  |                    |
| <b>Average:</b> | 0.0000  |       | <b>MDL:</b> 0.0050 |
| <b>Limit:</b>   | 0.0150  |       | <b>MRL:</b> 0.0150 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B183038  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** As

| Sample       | Result | Units |
|--------------|--------|-------|
| B183038-BLK1 | 0.003  | µg/L  |
| B183038-BLK2 | 0.004  | µg/L  |
| B183038-BLK3 | 0.003  | µg/L  |
| B183038-BLK4 | 0.002  | µg/L  |

**Average:** 0.003  
**Limit:** 0.040

**MDL:** 0.012  
**MRL:** 0.040

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1842044-01                 |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
|---|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|------------------------|
| <b>Sample:</b> PW-119+25-0-DS-101718-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A   | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B   | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C   | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |

| <b>Lab ID:</b> 1842044-02                   |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
|---|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|------------------------|
| <b>Sample:</b> PW-119+25-ST1-DS-101718-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                  | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A   | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B   | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C   | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |

| <b>Lab ID:</b> 1842044-03                 |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
|---|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|------------------------|
| <b>Sample:</b> PW-120+75-0-DS-101718-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A   | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B   | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C   | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1842044-04                   |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/17/2018 |                     |
|---|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-120+75-ST1-DS-101718-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/18/2018  |                     |
| <b>Des</b>                                  | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler #1 - 1842044 |
| B   | Bottle HDPE ICP-W        | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler #1 - 1842044 |
| C   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0084                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler #1 - 1842044 |
| <b>Lab ID:</b> 1842044-05                   |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/17/2018 |                     |
| <b>Sample:</b> PW-122+60-0-DS-101718-(20)   |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/18/2018  |                     |
| <b>Des</b>                                  | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler #1 - 1842044 |
| B   | Bottle HDPE ICP-W        | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler #1 - 1842044 |
| C   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler #1 - 1842044 |
| <b>Lab ID:</b> 1842044-06                   |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/17/2018 |                     |
| <b>Sample:</b> PW-123+25-ST1-DS-101718-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/18/2018  |                     |
| <b>Des</b>                                  | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler #1 - 1842044 |
| B   | Bottle HDPE ICP-W        | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler #1 - 1842044 |
| C   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler #1 - 1842044 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
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## Sample Containers

| <b>Lab ID:</b> 1842044-07                   |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
|---|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|------------------------|
| <b>Sample:</b> PW-123+25-ST1-DS-101718-(21) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                  | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A   | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B   | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C   | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |

| <b>Lab ID:</b> 1842044-08                 |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
|---|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|------------------------|
| <b>Sample:</b> PW-124+00-0-DS-101718-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A   | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B   | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C   | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |

| <b>Lab ID:</b> 1842044-09                  |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
|--|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|------------------------|
| <b>Sample:</b> SW-128+50-SW-DS-101718-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                 | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A  | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B  | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C  | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1842044-10                   |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
|---|-----------------------------|-------------|-----------------------------|---------------------------|--------------|------------------------------|------------------------|
| <b>Sample:</b> SW-120+75-SW-DS-101718-(20)  |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                  | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A   | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B   | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C   | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |
| <b>Lab ID:</b> 1842044-11                   |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
| <b>Sample:</b> PW-125+00-ST1-DS-101718-(20) |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                  | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A   | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B   | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C   | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0084                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |
| <b>Lab ID:</b> 1842044-12                   |                             |             | <b>Report Matrix:</b> Water |                           |              | <b>Collected:</b> 10/17/2018 |                        |
| <b>Sample:</b> SW-125+00-SW-DS-101718-(20)  |                             |             | <b>Sample Type:</b> Sample  |                           |              | <b>Received:</b> 10/18/2018  |                        |
| <b>Des</b>                                  | <b>Container</b>            | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>       | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>     |
| A   | FLPE - 125mL Bottle<br>Hg-T | 125 mL      | 18-0002                     | none                      | n/a          |                              | Cooler #1 -<br>1842044 |
| B   | Bottle HDPE ICP-W           | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)           | 1749190      | <2                           | Cooler #1 -<br>1842044 |
| C   | Bottle HDPE<br>ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3<br>(BAL) | 1649052      | <2                           | Cooler #1 -<br>1842044 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1842044-13                 |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/17/2018 |                     |
|---|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-125+50-0-DS-101718-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/18/2018  |                     |
| <b>Des</b>                                | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler #1 - 1842044 |
| B   | Bottle HDPE ICP-W        | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler #1 - 1842044 |
| C   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler #1 - 1842044 |

| <b>Lab ID:</b> 1842044-14                   |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/17/2018 |                     |
|---|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-126+80-ST1-DS-101718-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/18/2018  |                     |
| <b>Des</b>                                  | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler #1 - 1842044 |
| B   | Bottle HDPE ICP-W        | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler #1 - 1842044 |
| C   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler #1 - 1842044 |

| <b>Lab ID:</b> 1842044-15                 |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/17/2018 |                     |
|---|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-126+90-0-DS-101718-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/18/2018  |                     |
| <b>Des</b>                                | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler #1 - 1842044 |
| B   | Bottle HDPE ICP-W        | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler #1 - 1842044 |
| C   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler #1 - 1842044 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1842044-16                 |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/17/2018 |                     |
|---|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-128+30-0-DS-101718-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/18/2018  |                     |
| <b>Des</b>                                | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler #1 - 1842044 |
| B   | Bottle HDPE ICP-W        | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler #1 - 1842044 |
| C   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler #1 - 1842044 |

| <b>Lab ID:</b> 1842044-17                   |                          |             | <b>Report Matrix:</b> Water |                        |              | <b>Collected:</b> 10/17/2018 |                     |
|---|--------------------------|-------------|-----------------------------|------------------------|--------------|------------------------------|---------------------|
| <b>Sample:</b> PW-128+50-ST1-DS-101718-(20) |                          |             | <b>Sample Type:</b> Sample  |                        |              | <b>Received:</b> 10/18/2018  |                     |
| <b>Des</b>                                  | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                  | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                     | none                   | n/a          |                              | Cooler #1 - 1842044 |
| B   | Bottle HDPE ICP-W        | 125 mL      | 18-0189                     | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler #1 - 1842044 |
| C   | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0189                     | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler #1 - 1842044 |

| <b>Lab ID:</b> 1842044-18        |                          |             | <b>Report Matrix:</b> Water      |                        |              | <b>Collected:</b> 10/17/2018 |                    |
|----------------------------------|--------------------------|-------------|----------------------------------|------------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> EB-EB-101718-(20) |                          |             | <b>Sample Type:</b> Equip. Blank |                        |              | <b>Received:</b> 10/18/2018  |                    |
| <b>Des</b>                       | <b>Container</b>         | <b>Size</b> | <b>Lot</b>                       | <b>Preservation</b>    | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                | FLPE - 125mL Bottle Hg-T | 125 mL      | 18-0002                          | none                   | n/a          |                              | Cooler#2 - 1842044 |
| B                                | Bottle HDPE ICP-W        | 125 mL      | 18-0189                          | 0.2% HNO3 (BAL)        | 1749190      | <2                           | Cooler#2 - 1842044 |
| C                                | Bottle HDPE ICP-ChelCol  | 125 mL      | 18-0189                          | 0.2% Optima HNO3 (BAL) | 1649052      | <2                           | Cooler#2 - 1842044 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1842044  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### Cooler #1 - 1842044

**Received:** October 18, 2018 16:40  
**Tracking No:** n/a via Courier  
**Coolant Type:** Ice  
**Temperature:** 22.0 °C

**Description:** Cooler #1  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** Yes  
**Custody seals intact?** Yes  
**COC present?** Yes

### Cooler#2 - 1842044

**Received:** October 18, 2018 16:40  
**Tracking No:** n/a via Courier  
**Coolant Type:** Ice  
**Temperature:** 4.5 °C

**Description:** Cooler #2  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** Yes  
**Custody seals intact?** Yes  
**COC present?** No



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: [Signature] For BAL use only Date: 10/18/18  
Work Order ID: \_\_\_\_\_ Time: 16:40  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT (business days)  |                              | Collection |      | Client Sample Info |                      |                 |                   | BAL Analyses Required  |   |   |                                      |  |  | Comments |  |               |
|--|------------------------------|------------|------|--------------------|----------------------|-----------------|-------------------|--|---|---|--------------------------------------|--|--|----------|--|---------------|
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ |                              | Date       | Time | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |  |  |          |  | Specify Here  |
| *Surcharges may apply to expedited TATs  |                              |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |               |
| Sample ID  |                              |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |               |
| 1  | PW-119+25-0-DS-101718-(20)   | 10/17/18   | 930  | WATER              | 3                    | Y               | -                 |  |   | ✓   |                                      |  |  |          |  | 41897 (µS/cm) |
| 2  | PW-119+25-ST1-DS-101718-(20) |            | 1000 |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 37666         |
| 3  | PW-120+75-0-DS-101718-(20)   |            | 1015 |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 43779         |
| 4  | PW-120+75-ST1-DS-101718-(20) |            | 1045 |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 42447         |
| 5  | PW-122+60-0-DS-101718-(20)   |            | 1100 |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 40384         |
| 6  | PW-123+25-ST1-DS-101718-(20) |            | 1115 |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 44209         |
| 7  | PW-123+25-ST2-DS-101718-(21) |            | 1120 |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 44209         |
| 8  | PW-124+00-0-DS-101718-(20)   |            | 1130 |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 41567         |
| 9  | SW-128+50-SW-DS-101718-(20)  |            | 1315 |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 39737         |
| 10   | SW-120+75-SW-DS-101718-(20)  |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  | 44427         |
| Trip Blank (specify)   |                              |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |               |

Relinquished By: [Signature] Date: 10/18/18 Time: 0900 Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Received By: [Signature] Date: 10/18/18 Time: 1500 Total Number of Packages: \_\_\_\_\_

Print





# Chain-of-Custody Form

BAL Report 1842044

Received by: [Signature] For BAL use only Date: 10/18/18

Work Order ID: \_\_\_\_\_ Time: 16:40

Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

| Requested TAT<br>(business days)   | Collection                   |                       | Client Sample Info |                      |                 |                                 |  | BAL Analyses Required   |   |                                      |  |             |  | Comments |               |
|--|------------------------------|-----------------------|--------------------|----------------------|-----------------|---------------------------------|--|---|---|--------------------------------------|--|-------------|--|----------|---------------|
|  | Date                         | Time                  | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type               | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |  |             |  |          |               |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Specify Here                 |                       |                    |                      |                 |                                 |  |   |   |                                      |  |             |  |          |               |
| Sample ID  |                              |                       |                    |                      |                 |                                 |  |   |   |                                      |  |             |  |          |               |
| 1  | PW-125100-ST1-DS-101718-(20) | 10/17/18              | 1215               | WATER                | 3               | Y                               | 1  |   |   |                                      |  |             |  |          | 41779 (µS/cm) |
| 2  | JW-125700-JW-DS-101718-(20)  |                       | 1200               |                      |                 |                                 |  |   |   |                                      |  |             |  |          | 44309         |
| 3  | PW-125450-0-DS-101718-(20)   |                       | 1145               |                      |                 |                                 |  |   |   |                                      |  |             |  |          | 45272         |
| 4  | PW-126480-ST1-DS-101718-(20) |                       | 1300               |                      |                 |                                 |  |   |   |                                      |  |             |  |          | 44011         |
| 5  | PW-126490-0-DS-101718-(20)   |                       | 1230               |                      |                 |                                 |  |   |   |                                      |  |             |  |          | 42545         |
| 6  | PW-128130-0-DS-101718-(20)   |                       | 1245               |                      |                 |                                 |  |   |   |                                      |  |             |  |          | 41687         |
| 7  | PW-12850-ST1-DS-101718-(20)  |                       | 1330               |                      |                 |                                 |  |   |   |                                      |  |             |  |          | 43277         |
| 8  | ES-ES-101718-(20)            |                       | 1430               |                      |                 |                                 |  |   |   |                                      |  |             |  |          |               |
| 9  | <del>ES</del>                |                       |                    |                      |                 |                                 |  |   |   |                                      |  |             |  |          |               |
| 10   | <del>ES</del>                |                       |                    |                      |                 |                                 |  |   |   |                                      |  |             |  |          |               |
| Trip Blank (specify)   |                              |                       |                    |                      |                 |                                 |  |   |   |                                      |  |             |  |          |               |
| Relinquished By: <u>[Signature]</u>  |                              | Date: <u>10/18/18</u> |                    | Time: <u>0900</u>    |                 | Relinquished By: _____          |  |   |   | Date: _____                          |  | Time: _____ |  |          |               |
| Received By: <u>[Signature]</u>  |                              | Date: <u>10/18/18</u> |                    | Time: <u>1600</u>    |                 | Total Number of Packages: _____ |  |   |   |                                      |  |             |  |          |               |

Print



Drop off

Cooler #1

low

ice

CS ✓

IR # 15

22.0 °C

(1640)

125 HDPE

18-0189

125 mL HDPE

18-0084

THg

125 FLPE

18-0002

TM =

125 HDPE

18-0189

Cooler #2

no coc

ice

CS ✓

IR # 15

4.5

same bottle types



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • info@brooksapplied.com

# Certificate of Analysis

## Sampling Equipment

**Product Description:** 125mL HDPE Bottles

**BAL Lot Number:** 18-0189

**Date of Analysis:** October 1<sup>st</sup>, 2018 (SEQ: 1801322)

**Certified Value:** Copper < 0.045 µg/L  
Nickel < 0.030 µg/L  
Lead < 0.015 µg/L

**Certified Acceptable For:** Trace Metals by EPA 1638, EPA 1640, EPA 200.8, and EPA 6020

**Approved By:** Coila Craig  
Sr. QA Associate, BAL

A handwritten signature in black ink, appearing to read "Coila Craig", is written over a horizontal line.

**Signature:** \_\_\_\_\_

**Date:** October 19<sup>th</sup>, 2018 \_\_\_\_\_

**Data Gap #2ABC**  
**2018 Water Samples and Data**  
**Gap #4A Soil Samples (ARI)**

## QA/QC SOLUTIONS, LLC



James J. Mc Ateer, Jr., Managing Member  
7532 Champion Hill Rd. SE  
Salem, Oregon 97306  
Telephone: 503.763.6948  
Facsimile: 503.566.2114  
Cellular: 503.881.1501  
email: jjmcateer@msn.com

December 21, 2018

Troy Bussey Jr., P.E.  
PIONEER Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, Washington 98503

Subject: Feasibility Study Data Gap Investigation, Former Arkema Manufacturing Site, Tacoma, WA;  
Analytical Resources, Inc. 2018 Water and Soil Sample Data Validation Review Summary  
Client Project No.: Not Specified  
QA/QC Solutions, LLC Project No.: 091018.1

Dear Troy:

This letter documents the results of the data validation review of dissolved arsenic analyses completed on water samples collected in October 2018 and for total arsenic, toxicity characteristic leaching procedure (TCLP) metals (elements), and pH analyses completed on soil samples collected in September 2018. The data is associated with Feasibility Study Data Gap Investigation completed at the Former Arkema Manufacturing Site located in Tacoma, Washington. Details of the investigation completed are provided in the Feasibility Study Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. (Pioneer 2017).

The water and soil data reported were validated to verify the laboratory quality assurance and quality control (QA/QC) procedures were documented and that the overall quality of the data reported is sufficient to support its intended purposes. A summary of the overall assessment of data quality, the data set, a summary of the analytical methods used to complete the chemical analyses, a summary of the data validation procedures used, and a summary of the reasons why data were qualified (including other items noted during data validation) is presented below.

### Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratory during the analysis of the samples were generally acceptable. Selected sample results required qualification during data validation because method-specific QA/QC criteria were not met; results maybe qualified for more than one reason. During data validation, the following actions were taken:

- A total of 67 results reported as detected were qualified as estimated (assigned a *J* qualifier).
- A total of 77 results reported as detected were restated as undetected (assigned a *U* qualifier).
- A total of 7 metal results were reported as undetected (*U*) at a concentration lower than the concentration found in the associated method blank and were subsequently restated as undetected (*U*) at the concentration of the method blank.
- No results required restatement as undetected and estimated (*UJ*) or rejection (*R*).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J*) by the laboratory or during data validation. These qualified data are usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data). Analytical data that were reported as undetected (*U*) by the laboratory or that were restated as undetected (*U*) during data validation are usable. A summary of the qualified data and reasons for qualification are in Table 2.

## Data Set

For the water samples, the data set consisted of a total of 42 samples (includes natural, field duplicate, and equipment rinsate blank samples). All water samples were field filtered (0.45 µm) and were collected in October 2018. A summary of the water samples collected and the analyses completed is presented in Table 1.

For the soil samples, the data set consisted of 53 samples (includes natural, field duplicate, and equipment rinsate blank samples). The soil samples and equipment rinsate blanks were collected in September 2018. A summary of the soil samples collected and the analyses completed is presented in Table 1.

Analyses were completed by Analytical Resources, Inc. (ARI) located in Tukwila, Washington. ARI submitted 6 work orders (see Table 1 for reference) summarizing the results of the samples and associated quality control data.

## Analytical Methods

The analytical methods that were used to complete the chemical analyses included the following:

- Water samples were analyzed for dissolved arsenic by field filtration through 0.45µm filter and analyzed by inductively coupled plasma-mass spectrometry (ICP-MS) using U.S. EPA SW-846 Method 6020A (U.S. EPA 2018).
- Soil samples were analyzed for total arsenic by digestion and inductively coupled plasma-atomic emission spectrometry (ICP-AES) using SW-846 Method 6010C (U.S. EPA 2018).
- The pH of the soil samples was determined by electrometric measurement using U.S. EPA SW-846 Method 9045D (U.S. EPA 2018).
- Soil samples were prepared using the Toxicity Characteristic Leaching Procedure (TCLP) by SW-846 Method 1311 (U.S. EPA 2018) and the leachates were analyzed for arsenic, barium, cadmium, chromium, lead, selenium and silver by (ICP-AES) using SW-846 Method 6010C (U.S. EPA 2018) and mercury by cold vapor atomic absorption (CVAA) using SW-846 Method 7470A (U.S. EPA 2018)

## Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results that were reported by the laboratory; this level of validation is also referred to as an abbreviated data review (equivalent to “Stage 2B” review per U.S. EPA 2009, which is equivalent to “Level EPA2B” for use with the Washington Department of Ecology EIMS database). The analytical data were validated generally following the applicable guidance and requirements:

- *Guidance on Environmental Data Verification and Validation* (U.S. EPA 2002)
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review*. Final. OSWER 9240.1-51. EPA 540-R-10-011 (U.S. EPA 2010).
- Method-specific and laboratory-established quality control requirements, as applicable.

Data validation procedures were modified to accommodate QA/QC requirements for methods (e.g., conventional parameters) that are not specifically addressed by the USEPA functional guidelines. In this situation, method-specific and laboratory-established control limits were used, as necessary, to determine if qualification of the data was necessary. The laboratory data deliverables that were validated, if present, included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Sample preparation logs or laboratory summary result forms to verify analytical holding times were met.
- Results for applicable method blanks and field blanks to determine whether an analyte that was reported as detected in any sample was the result of possible contamination introduced at the laboratory or during field sampling, respectively.
- Results for applicable standard reference material (SRM), laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, matrix spike (MS), and/or matrix spike duplicate (MSD) recoveries to assess analytical accuracy
- Results for applicable laboratory duplicate sample, duplicate LCS, and/or MSD analyses to assess analytical precision.
- Results for the field duplicate samples to provide additional information in support of the quality assurance review.
- Laboratory summaries of analytical results.

Verification of 100-percent of all applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets was not completed during the data validation review. There may be analytical problems that could only be identified by reviewing every instrument printouts and associated analytical quality control results. Confirmation of all possible factors that could result in the degradation of data quality was not completed nor should be inferred at this time. The laboratory case narratives did not indicate any significant problems with data that were not reviewed during data validation. The adequacy of the sampling procedures was not completed during the data validation.

Performance based control limits established by the laboratory and applicable control limits specified in the analytical methods were used to evaluate data quality and to determine if specific data required qualification. Data qualifiers were assigned during data validation following guidance specified by U.S. EPA (2002 and 2010) to the EDD when applicable QC measurement criteria were not met and qualification of the data was warranted.

## Reasons for Data Qualification

The reasons for data qualification and a summary of the qualified data are summarized in Table 2 and include the following:

- A total of 67 results reported as detected at a concentration above the method detection limit (MDL), but less than the reporting limit (RL) were qualified as estimated (*J*).
- A total of 77 metal results reported as detected were restated as undetected (assigned a *U* qualifier).
- A total of 7 metal results were reported as undetected (*U*) at a concentration lower than the concentration found in the associated method blank and were subsequently restated as undetected (*U*) at the concentration of the method blank.

## General Comments

In some instances, matrix spike recoveries could not be reliably calculated because the concentration of the affected element in the native sample was significantly greater than the spike concentration added. In one instance the recovery of mercury in on MS was above the upper control limit; however, no sample results required qualification for this reason because mercury was not reported as detected in the associated samples. The RPD between a replicate laboratory sample analysis could not be reliably calculated in some instances because the concentrations were below the associated reporting limit.

This concludes the data validation review summary. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at [jjmcaeter@msn.com](mailto:jjmcaeter@msn.com).

Cordially,



QA/QC Solutions, LLC

James J. Mc Ateer, Jr., Managing Member

Attachments

## References

Pioneer 2017. FS Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. February 2017. Prepared for Port of Tacoma. Prepared by Pioneer Technologies Corporation.

U.S. EPA 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002. U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC.

U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA 2010. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OSWER 9240.1-51. EPA 540-R-10-011. January 2010. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC.

U.S. EPA 2018. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. <https://www.epa.gov/hw-sw846/sw-846-compendium> (last updated on October 15, 2018). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC



**Table 1. Summary of Samples Collected and Analyses Completed**

| Sample Number                    | Laboratory Sample Number | Sample Date | Dissolved Arsenic by 6020A | Total Arsenic by 6010C | pH by 9045D | TCLP Metals by 1311, 6010C, and 7470A |
|----------------------------------|--------------------------|-------------|----------------------------|------------------------|-------------|---------------------------------------|
| <b>Water Samples</b>             |                          |             |                            |                        |             |                                       |
| <b><u>Work Order 18J0149</u></b> |                          |             |                            |                        |             |                                       |
|                                  | GW-8G2-1-100218-(20)     | 18J0149-01  | 10/02/18                   | ✓                      |             |                                       |
|                                  | GW-7E6-2-100318-(20)     | 18J0149-02  | 10/03/18                   | ✓                      |             |                                       |
|                                  | GW-7E7-2-100318-(20)     | 18J0149-03  | 10/03/18                   | ✓                      |             |                                       |
|                                  | GW-7E10-1-100318-(20)    | 18J0149-04  | 10/03/18                   | ✓                      |             |                                       |
|                                  | GW-7F2-1-100318-(20)     | 18J0149-05  | 10/03/18                   | ✓                      |             |                                       |
|                                  | GW-7F3-1-100318-(20)     | 18J0149-06  | 10/03/18                   | ✓                      |             |                                       |
|                                  | GW-7E9-2-100318-(20)     | 18J0149-07  | 10/03/18                   | ✓                      |             |                                       |
|                                  | GW-7E8-1-100318-(20)     | 18J0149-08  | 10/03/18                   | ✓                      |             |                                       |
|                                  | GW-6E12-2-100318-(20)    | 18J0149-09  | 10/03/18                   | ✓                      |             |                                       |
|                                  | GW-7F4-1-100518-(20)     | 18J0149-10  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-6E9-2-100418-(20)     | 18J0149-11  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-6E6-1-100418-(20)     | 18J0149-12  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-7E3-1-100418-(20)     | 18J0149-13  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-6D14-1-100418-(20)    | 18J0149-14  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-6E1-1-100418-(20)     | 18J0149-15  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-6D25-1-100418-(20)    | 18J0149-16  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-6D25-2-100418-(20)    | 18J0149-17  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-5C21-2-100418-(20)    | 18J0149-18  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-7E16-2-100418-(20)    | 18J0149-19  | 10/04/18                   | ✓                      |             |                                       |
|                                  | GW-EB-EB-100518-(20)     | 18J0149-20  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-5C12-1-100518-(20)    | 18J0149-21  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-5C13-1-100518-(20)    | 18J0149-22  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-5D2-1R-100518-(20)    | 18J0149-23  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-5D2-1R-100518-(21)    | 18J0149-24  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-5C16-2R-100518-(20)   | 18J0149-25  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-5C16-1R-100518-(20)   | 18J0149-26  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-4C1-1-100518-(20)     | 18J0149-27  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-4D1-1-100518-(20)     | 18J0149-28  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-6E5-1-100518-(20)     | 18J0149-29  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-5E4-1-100518-(20)     | 18J0149-30  | 10/05/18                   | ✓                      |             |                                       |
|                                  | GW-5D7-1R-100518-(20)    | 18J0149-31  | 10/05/18                   | ✓                      |             |                                       |
| <b><u>Work Order 18J0293</u></b> |                          |             |                            |                        |             |                                       |
|                                  | GW-5D1-3-101218-(20)     | 18J0293-01  | 10/12/18                   | ✓                      |             |                                       |
|                                  | GW-8F1-1R-101518-(20)    | 18J0293-02  | 10/15/18                   | ✓                      |             |                                       |
|                                  | GW-5D5-1-101518-(20)     | 18J0293-03  | 10/15/18                   | ✓                      |             |                                       |
|                                  | GW-5E1-1-101518-(20)     | 18J0293-04  | 10/15/18                   | ✓                      |             |                                       |

Table 1, continued

| Sample Number                    | Laboratory Sample Number | Sample Date | Dissolved Arsenic by 6020A | Total Arsenic by 6010C | pH by 9045D | TCLP Metals by 1311, 6010C, and 7470A |
|----------------------------------|--------------------------|-------------|----------------------------|------------------------|-------------|---------------------------------------|
| GW-5E8-1-101518-(20)             | 18J0293-05               | 10/15/18    | ✓                          |                        |             |                                       |
| GW-5E2-1-101518-(20)             | 18J0293-06               | 10/15/18    | ✓                          |                        |             |                                       |
| GW-5E2-1-101518-(21)             | 18J0293-07               | 10/15/18    | ✓                          |                        |             |                                       |
| EB-EB-101218-(20)                | 18J0293-08               | 10/15/18    | ✓                          |                        |             |                                       |
| GW-6E7-3-101518-(20)             | 18J0293-09               | 10/15/18    | ✓                          |                        |             |                                       |
| GW-6E2-1-101618-(20)             | 18J0293-10               | 10/16/18    | ✓                          |                        |             |                                       |
| GW-7E4-2-101618-(20)             | 18J0293-11               | 10/16/18    | ✓                          |                        |             |                                       |
| <b>Soil Samples</b>              |                          |             |                            |                        |             |                                       |
| <b>Work Order 1810270</b>        |                          |             |                            |                        |             |                                       |
| SO-PTC-122-091818-2.0-3.0        | 1810270-01               | 09/18/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-122-091818-2.0-3.0-(10)   | 1810270-02               | 09/18/18    |                            |                        |             | ✓                                     |
| SO-PTC-122-091818-9.5-10.5       | 1810270-03               | 09/18/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-122-091818-9.5-10.5-(10)  | 1810270-04               | 09/18/18    |                            |                        |             | ✓                                     |
| SO-PTC-123-091718-3.5-4.0        | 1810270-05               | 09/17/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-123-091718-3.5-4.0-(10)   | 1810270-06               | 09/17/18    |                            |                        |             | ✓                                     |
| SO-PTC-123-091718-13.0-14.0      | 1810270-07               | 09/17/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-123-091718-13.0-14.0-(10) | 1810270-08               | 09/17/18    |                            |                        |             | ✓                                     |
| SO-PTC-124-091718-8.5-9.5        | 1810270-09               | 09/17/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-124-091718-8.5-9.5-(10)   | 1810270-10               | 09/17/18    |                            |                        |             | ✓                                     |
| SO-PTC-124-091718-12.0-13.0      | 1810270-11               | 09/17/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-124-091718-12.0-13.0-(10) | 1810270-12               | 09/17/18    |                            |                        |             | ✓                                     |
| SO-PTC-125-091718-1.0-2.0        | 1810270-13               | 09/17/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-125-091718-1.0-2.0-(10)   | 1810270-14               | 09/17/18    |                            |                        |             | ✓                                     |
| SO-PTC-125-091718-12.0-13.0      | 1810270-15               | 09/17/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-125-091718-12.0-13.0-(10) | 1810270-16               | 09/17/18    |                            |                        |             | ✓                                     |
| SO-PTC-127-091818-7.0-7.5        | 1810270-17               | 09/18/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-127-091818-7.0-7.5-(10)   | 1810270-18               | 09/18/18    |                            |                        |             | ✓                                     |
| SO-PTC-127-091818-17.0-17.5      | 1810270-19               | 09/18/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-127-091818-17.0-17.5-(10) | 1810270-20               | 09/18/18    |                            |                        |             | ✓                                     |
| SO-PTC-110-091818-11-12          | 1810270-21               | 09/18/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-110-091818-11-12-(10)     | 1810270-22               | 09/18/18    |                            |                        |             | ✓                                     |
| SO-PTC-110-091818-16-17          | 1810270-23               | 09/18/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-110-091818-16-17-(10)     | 1810270-24               | 09/18/18    |                            |                        |             | ✓                                     |
| SO-PTC-126-091818-9-10           | 1810270-25               | 09/18/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-126-091818-9-10-(10)      | 1810270-26               | 09/18/18    |                            |                        |             | ✓                                     |
| SO-PTC-126-091818-13.5-14        | 1810270-27               | 09/18/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-126-091818-13.5-14-(10)   | 1810270-28               | 09/18/18    |                            |                        |             | ✓                                     |

Table 1, continued

| Sample Number                    | Laboratory Sample Number | Sample Date | Dissolved Arsenic by 6020A | Total Arsenic by 6010C | pH by 9045D | TCLP Metals by 1311, 6010C, and 7470A |
|----------------------------------|--------------------------|-------------|----------------------------|------------------------|-------------|---------------------------------------|
| <b>Work Order 1810318</b>        |                          |             |                            |                        |             |                                       |
| SO-PTC-130-091918-9.5-10.0       | 1810318-01               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-130-091918-9.5-10.0-(10)  | 1810318-02               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-130-091918-11.0-11.5-(10) | 1810318-03               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-130-091918-11.0-11.5      | 1810318-04               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-119-091918-6.0-6.5-(10)   | 1810318-05               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-119-091918-6.0-6.5        | 1810318-06               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-119-091918-11.5-12.0-(10) | 1810318-07               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-119-091918-11.5-12.0      | 1810318-08               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-128-091918-6.0-6.5-(10)   | 1810318-09               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-128-091918-6.0-6.5        | 1810318-10               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-128-091918-7.5-8.0-(10)   | 1810318-11               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-128-091918-7.5-8.0        | 1810318-12               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-116-091918-8.5-9.0-(10)   | 1810318-13               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-116-091918-8.5-9.0        | 1810318-14               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-116-091918-13.1-13.6-(10) | 1810318-15               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-116-091918-13.1-13.6      | 1810318-16               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-115-091918-7.5-8.0-(10)   | 1810318-17               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-115-091918-7.5-8.0        | 1810318-18               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-115-091918-14.5-15.0-(10) | 1810318-19               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-115-091918-14.5-15.0      | 1810318-20               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-114-092018-7.0-7.5        | 1810318-21               | 09/19/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-114-092018-7.0-7.5-(10)   | 1810318-22               | 09/19/18    |                            |                        |             | ✓                                     |
| SO-PTC-114-092018-13.3-13.8      | 1810318-23               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-114-092018-13.3-13.8-(10) | 1810318-24               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-118-092018-8.0-8.5        | 1810318-25               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-118-092018-8.0-8.5-(10)   | 1810318-26               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-118-092018-10.5-11.0      | 1810318-27               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-118-092018-10.5-11.0-(10) | 1810318-28               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-117-092018-6.4-6.9        | 1810318-29               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-117-092018-6.4-6.9-(10)   | 1810318-30               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-117-092018-(01)           | 1810318-31               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-117-092018-(11)           | 1810318-32               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-117-092018-14.5-15.0      | 1810318-33               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-117-092018-14.5-15.0-(10) | 1810318-34               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-112-092018-10.5-11.0      | 1810318-35               | 09/20/18    |                            | ✓                      | ✓           |                                       |

Table 1, continued

| Sample Number                            | Laboratory Sample Number | Sample Date | Dissolved Arsenic by 6020A | Total Arsenic by 6010C | pH by 9045D | TCLP Metals by 1311, 6010C, and 7470A |
|--|--------------------------|-------------|----------------------------|------------------------|-------------|---------------------------------------|
| SO-PTC-112-092018-10.5-11.0-(10)         | 18I0318-36               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-112-092018-17.0-18.0              | 18I0318-37               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-112-092018-17.0-18.0-(10)         | 18I0318-38               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-104-092018-13.4-13.9              | 18I0318-39               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-104-092018-13.4-13.9-(10)         | 18I0318-40               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-104-092018-14.2-14.7              | 18I0318-41               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-104-092018-14.2-14.7-(10)         | 18I0318-42               | 09/20/18    |                            |                        |             | ✓                                     |
| <b>Work Order 18I0334</b>                |                          |             |                            |                        |             |                                       |
| SO-PTC-120-092118-9.0-10.0               | 18I0334-01               | 09/20/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-120-092118-9.0-10.0-(10)          | 18I0334-02               | 09/20/18    |                            |                        |             | ✓                                     |
| SO-PTC-120-092118-11.0-12.0              | 18I0334-03               | 09/21/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-120-092118-11.0-12.0-(10)         | 18I0334-04               | 09/21/18    |                            |                        |             | ✓                                     |
| SO-PTC-108-092118-12.0-12.5              | 18I0334-05               | 09/21/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-108-092118-12.0-12.5-(10)         | 18I0334-06               | 09/21/18    |                            |                        |             | ✓                                     |
| SO-PTC-108-092118-13.2-14.2              | 18I0334-07               | 09/21/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-108-092118-13.2-14.2-(10)         | 18I0334-08               | 09/21/18    |                            |                        |             | ✓                                     |
| SO-PTC-102-092118-7.5-8.5                | 18I0334-09               | 09/21/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-102-092118-7.5-8.5-(10)           | 18I0334-10               | 09/21/18    |                            |                        |             | ✓                                     |
| SO-PTC-102-092118-14.5-15.0              | 18I0334-11               | 09/21/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-102-092118-14.5-15.0-(10)         | 18I0334-12               | 09/21/18    |                            |                        |             | ✓                                     |
| SO-PTC-103-092118-7.5-8.5                | 18I0334-13               | 09/21/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-103-092118-7.5-8.5-(10)           | 18I0334-14               | 09/21/18    |                            |                        |             | ✓                                     |
| SO-PTC-103-092118-12.8-13.8              | 18I0334-15               | 09/21/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-103-092118-12.8-13.8-(10)         | 18I0334-16               | 09/21/18    |                            |                        |             | ✓                                     |
| <b>Work Order 18I0353</b>                |                          |             |                            |                        |             |                                       |
| SO-PTC-109-092418-5.0-6.0                | 18I0353-01               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-109-092418-5.0-6.0-(10)           | 18I0353-02               | 09/24/18    |                            |                        |             | ✓                                     |
| SO-PTC-109-092418-13.0-14.0-(10)         | 18I0353-03               | 09/24/18    |                            |                        |             | ✓                                     |
| SO-PTC-109-092418-13.0-14.0              | 18I0353-04               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-107-092418-6.0-7.0                | 18I0353-05               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-107-092418-6.0-7.0-(10)           | 18I0353-06               | 09/24/18    |                            |                        |             | ✓                                     |
| SO-PTC-107-092418-11.0-12.0              | 18I0353-07               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-107-092418-11.0-12.0-(10)         | 18I0353-08               | 09/24/18    |                            |                        |             | ✓                                     |
| EB-01-092418 (equip. rinsate blank)      | 18I0353-9                | 09/24/18    |                            | ✓                      |             |                                       |
| EB-01-092418-(10) (equip. rinsate blank) | 18I0353-10               | 09/24/18    |                            |                        |             | ✓                                     |
| SO-PTC-106-092418-7.0-8.0                | 18I0353-11               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-106-092418-7.0-8.0-(10)           | 18I0353-12               | 09/24/18    |                            |                        |             | ✓                                     |

Table 1, continued

| Sample Number                    | Laboratory Sample Number | Sample Date | Dissolved Arsenic by 6020A | Total Arsenic by 6010C | pH by 9045D | TCLP Metals by 1311, 6010C, and 7470A |
|----------------------------------|--------------------------|-------------|----------------------------|------------------------|-------------|---------------------------------------|
| SO-PTC-106-092418-13.0-14.0      | 1810353-13               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-106-092418-13.0-14.0-(10) | 1810353-14               | 09/24/18    |                            |                        |             | ✓                                     |
| SO-PTC-105-092418-8.0-9.0        | 1810353-15               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-105-092418-8.0-9.0-(10)   | 1810353-16               | 09/24/18    |                            |                        |             | ✓                                     |
| SO-PTC-105-092418-(01)           | 1810353-17               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-105-092418-(11)           | 1810353-18               | 09/24/18    |                            |                        |             | ✓                                     |
| SO-PTC-105-092418-13.0-14.0      | 1810353-19               | 09/24/18    |                            | ✓                      | ✓           |                                       |
| SO-PTC-105-092418-13.0-14.0-(10) | 1810353-20               | 09/24/18    |                            |                        |             | ✓                                     |
| <b>Total Number of Samples:</b>  |                          |             | 42                         | 53                     | 52          | 53                                    |

**Table 2. Summary of Qualified Data**

| Sample Number*                   | Laboratory Sample Number | Chemical            | Concentration | Units | MDL      | RL       | Laboratory Data Flag | Validation n Qualifier | Quality Control Reason     | Quality Control Result  | Possible Bias <sup>b,c,d</sup> |
|----------------------------------|--------------------------|---------------------|---------------|-------|----------|----------|----------------------|------------------------|----------------------------|-------------------------|--------------------------------|
| <b>TCLP Samples</b>              |                          |                     |               |       |          |          |                      |                        |                            |                         |                                |
| SO-PTC-122-091818-2.0-3.0-(10)   | 1810270-02               | Barium              | 0.0167        | mg/l  | 0.0075   | 0.0150   |                      | U                      | Detected in method blank   | Detected at 0.0107 mg/L | False positive                 |
|                                  |                          | Cadmium             | 0.0021        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0021 mg/L | False positive                 |
|                                  |                          | Chromium, Total     | 0.0065        | mg/l  | 0.0024   | 0.0250   | J                    | U                      | Detected in method blank   | Detected at 0.0054 mg/L | False positive                 |
|                                  |                          | Lead and Compounds  | 0.0087        | mg/l  | 0.0065   | 0.0150   | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-122-091818-9.5-10.5-(10)  | 1810270-04               | Barium              | 0.0267        | mg/l  | 0.0075   | 0.0150   |                      | U                      | Detected in method blank   | Detected at 0.0107 mg/L | False positive                 |
| SO-PTC-123-091718-3.5-4.0-(10)   | 1810270-06               | Barium              | 0.0724        | mg/l  | 0.0075   | 0.0150   |                      | U                      | Detected in method blank   | Detected at 0.0107 mg/L | False positive                 |
|                                  |                          | Cadmium             | 0.0021        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0021 mg/L | False positive                 |
|                                  |                          | Chromium, Total     | 0.0054        | mg/l  | 0.0024   | 0.0250   | U                    | U                      | Detected in method blank   | Detected at 0.0054 mg/L | False positive                 |
|                                  |                          | Mercury (elemental) | 0.000015      | mg/l  | 0.000007 | 0.000100 | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-123-091718-13.0-14.0-(10) | 1810270-08               | Barium              | 0.0357        | mg/l  | 0.0075   | 0.0150   |                      | U                      | Detected in method blank   | Detected at 0.0107 mg/L | False positive                 |
|                                  |                          | Cadmium             | 0.0021        | mg/l  | 0.0006   | 0.0100   | U                    | U                      | Detected in method blank   | Detected at 0.0021 mg/L | False positive                 |
|                                  |                          | Chromium, Total     | 0.0054        | mg/l  | 0.0024   | 0.0250   | U                    | U                      | Detected in method blank   | Detected at 0.0054 mg/L | False positive                 |
| SO-PTC-124-091718-8.5-9.5-(10)   | 1810270-10               | Barium              | 0.0283        | mg/l  | 0.0075   | 0.0150   |                      | U                      | Detected in method blank   | Detected at 0.0107 mg/L | False positive                 |
|                                  |                          | Cadmium             | 0.0021        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0021 mg/L | False positive                 |
|                                  |                          | Chromium, Total     | 0.0054        | mg/l  | 0.0024   | 0.0250   | U                    | U                      | Detected in method blank   | Detected at 0.0054 mg/L | False positive                 |
| SO-PTC-124-091718-12.0-13.0-(10) | 1810270-12               | Arsenic, Inorganic  | 0.0142        | mg/l  | 0.0140   | 0.250    | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Barium              | 0.0656        | mg/l  | 0.0075   | 0.0150   |                      | U                      | Detected in method blank   | Detected at 0.0107 mg/L | False positive                 |
|                                  |                          | Cadmium             | 0.0021        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0021 mg/L | False positive                 |
|                                  |                          | Chromium, Total     | 0.0098        | mg/l  | 0.0024   | 0.0250   | J                    | U                      | Detected in method blank   | Detected at 0.0054 mg/L | False positive                 |
|                                  |                          | Lead and Compounds  | 0.0079        | mg/l  | 0.0065   | 0.100    | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-125-091718-1.0-2.0-(10)   | 1810270-14               | Arsenic, Inorganic  | 0.0335        | mg/l  | 0.0140   | 0.250    | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Barium              | 0.0427        | mg/l  | 0.0075   | 0.0150   |                      | U                      | Detected in method blank   | Detected at 0.0107 mg/L | False positive                 |
|                                  |                          | Cadmium             | 0.0021        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0021 mg/L | False positive                 |
|                                  |                          | Chromium, Total     | 0.0054        | mg/l  | 0.0024   | 0.0250   | U                    | U                      | Detected in method blank   | Detected at 0.0054 mg/L | False positive                 |
|                                  |                          | Lead and Compounds  | 0.0106        | mg/l  | 0.0065   | 0.100    | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-125-091718-12.0-13.0-(10) | 1810270-16               | Barium              | 0.0105        | mg/l  | 0.0075   | 0.0150   | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Cadmium             | 0.0029        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-127-091818-7.0-7.5-(10)   | 1810270-18               | Arsenic, Inorganic  | 0.165         | mg/l  | 0.0140   | 0.250    | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Barium              | 0.0083        | mg/l  | 0.0075   | 0.0150   | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Cadmium             | 0.0037        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-127-091818-17.0-17.5-(10) | 1810270-20               | Cadmium             | 0.0038        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
|                                  |                          | Chromium, Total     | 0.0240        | mg/l  | 0.0024   | 0.0250   | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-110-091818-11-12-(10)     | 1810270-22               | Cadmium             | 0.0029        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
|                                  |                          | Lead and Compounds  | 0.0086        | mg/l  | 0.0065   | 0.100    | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-110-091818-16-17-(10)     | 1810270-24               | Barium              | 0.0289        | mg/l  | 0.0149   | 0.0300   | J, D                 | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Cadmium             | 0.0029        | mg/l  | 0.0012   | 0.02     |                      | U                      | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
|                                  |                          | Chromium, Total     | 0.0213        | mg/l  | 0.0047   | 0.0500   | J, D                 | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000020      | mg/l  | 0.000007 | 0.000100 | J                    | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Silver              | 0.0048        | mg/l  | 0.0044   | 0.0300   | J, D                 | J                      | Concentration is >MDL, <RL | NA                      | Low or high                    |

Table 2, continued

| Sample Number*                   | Laboratory Sample Number | Chemical            | Concentration | Units | MDL      | RL       | Laboratory Data Flag | Validation | Quality Control Reason     | Quality Control Result  | Possible Bias <sup>b,c,d</sup> |
|----------------------------------|--------------------------|---------------------|---------------|-------|----------|----------|----------------------|------------|----------------------------|-------------------------|--------------------------------|
|                                  |                          |                     |               |       |          |          |                      | Qualifier  |                            |                         |                                |
| SO-PTC-126-091818-9-10-(10)      | 18I0270-26               | Barium              | 0.0141        | mg/l  | 0.0075   | 0.0150   | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Cadmium             | 0.0038        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-126-091818-13.5-14-(10)   | 18I0270-28               | Cadmium             | 0.0034        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-130-091918-9.5-10.0-(10)  | 18I0318-02               | Cadmium             | 0.0029        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
|                                  |                          | Mercury (elemental) | 0.000008      | mg/l  | 0.000007 | 0.000100 | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-130-091918-11.0-11.5-(10) | 18I0318-03               | Cadmium             | 0.0038        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-119-091918-6.0-6.5-(10)   | 18I0318-05               | Cadmium             | 0.0030        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-119-091918-11.5-12.0-(10) | 18I0318-07               | Cadmium             | 0.0065        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-128-091918-6.0-6.5-(10)   | 18I0318-09               | Cadmium             | 0.0045        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-128-091918-7.5-8.0-(10)   | 18I0318-11               | Cadmium             | 0.0033        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-116-091918-8.5-9.0-(10)   | 18I0318-13               | Arsenic, Inorganic  | 0.240         | mg/l  | 0.0140   | 0.250    | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Barium              | 0.0134        | mg/l  | 0.0075   | 0.0150   | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Cadmium             | 0.0029        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-116-091918-13.1-13.6-(10) | 18I0318-15               | Cadmium             | 0.0033        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0029 mg/L | False positive                 |
| SO-PTC-115-091918-7.5-8.0-(10)   | 18I0318-17               | Arsenic, Inorganic  | 0.134         | mg/l  | 0.0140   | 0.250    | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Barium              | 0.0394        | mg/l  | 0.0075   | 0.0150   |                      | U          | Detected in method blank   | Detected at 0.0141      | False positive                 |
|                                  |                          | Cadmium             | 0.0015        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0007      | False positive                 |
|                                  |                          | Chromium, Total     | 0.0033        | mg/l  | 0.0024   | 0.0250   | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-115-091918-14.5-15.0-(10) | 18I0318-19               | Barium              | 0.0260        | mg/l  | 0.0075   | 0.0150   |                      | U          | Detected in method blank   | Detected at 0.0141      | False positive                 |
|                                  |                          | Cadmium             | 0.0030        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0007      | False positive                 |
|                                  |                          | Chromium, Total     | 0.0076        | mg/l  | 0.0024   | 0.0250   | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000038      | mg/l  | 0.000007 | 0.000100 | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-114-092018-7.0-7.5-(10)   | 18I0318-22               | Arsenic, Inorganic  | 0.187         | mg/l  | 0.0140   | 0.250    | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Barium              | 0.0225        | mg/l  | 0.0075   | 0.0150   | B, U                 | U          | Detected in method blank   | Detected at 0.0225      | False positive                 |
|                                  |                          | Cadmium             | 0.0027        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0014      | False positive                 |
|                                  |                          | Selenium            | 0.0900        | mg/l  | 0.0408   | 0.250    | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-114-092018-13.3-13.8-(10) | 18I0318-24               | Barium              | 0.115         | mg/l  | 0.0075   | 0.0150   | B                    | U          | Detected in method blank   | Detected at 0.0225      | False positive                 |
|                                  |                          | Cadmium             | 0.0072        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0014      | False positive                 |
|                                  |                          | Selenium            | 0.113         | mg/l  | 0.0408   | 0.250    | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-118-092018-8.0-8.5-(10)   | 18I0318-26               | Barium              | 0.0299        | mg/l  | 0.0075   | 0.0150   | B                    | U          | Detected in method blank   | Detected at 0.0225      | False positive                 |
|                                  |                          | Cadmium             | 0.0015        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0014      | False positive                 |
|                                  |                          | Selenium            | 0.0574        | mg/l  | 0.0408   | 0.250    | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
| SO-PTC-118-092018-10.5-11.0-(10) | 18I0318-28               | Barium              | 0.0126        | mg/l  | 0.0075   | 0.0150   | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Cadmium             | 0.0020        | mg/l  | 0.0006   | 0.0100   | J                    | U          | Detected in method blank   | Detected at 0.0007      | False positive                 |
|                                  |                          | Chromium, Total     | 0.0058        | mg/l  | 0.0024   | 0.0250   | J                    | J          | Concentration is >MDL, <RL | NA                      | Low or high                    |
|                                  |                          | Selenium            | 0.122         | mg/l  | 0.0408   | 0.250    | J                    | U          | Detected in method blank   | Detected at 0.0654      | False positive                 |

Table 2, continued

| Sample Number*                   | Laboratory Sample Number | Chemical            | Concentration | Units | MDL      | RL       | Laboratory Data Flag | Validation n Qualifier | Quality Control Reason     | Quality Control Result | Possible Bias <sup>b,c,d</sup> |
|----------------------------------|--------------------------|---------------------|---------------|-------|----------|----------|----------------------|------------------------|----------------------------|------------------------|--------------------------------|
| SO-PTC-117-092018-6.4-6.9-(10)   | 1810318-30               | Arsenic, Inorganic  | 0.0869        | mg/l  | 0.0140   | 0.250    | J                    | U                      | Detected in method blank   | Detected at 0.0216     | False positive                 |
|                                  |                          | Barium              | 0.0106        | mg/l  | 0.0075   | 0.0150   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Cadmium             | 0.0008        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0007     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0140        | mg/l  | 0.0024   | 0.0250   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-117-092018-(11)           | 1810318-32               | Selenium            | 0.0766        | mg/l  | 0.0408   | 0.250    | J                    | U                      | Detected in method blank   | Detected at 0.0654     | False positive                 |
|                                  |                          | Arsenic, Inorganic  | 0.164         | mg/l  | 0.0140   | 0.250    | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Barium              | 0.0138        | mg/l  | 0.0075   | 0.0150   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Cadmium             | 0.0034        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0007     | False positive                 |
| SO-PTC-117-092018-14.5-15.0-(10) | 1810318-34               | Chromium, Total     | 0.0125        | mg/l  | 0.0024   | 0.0250   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Selenium            | 0.0654        | mg/l  | 0.0408   | 0.250    | J                    | U                      | Detected in method blank   | Detected at 0.0654     | False positive                 |
|                                  |                          | Selenium            | 0.0846        | mg/l  | 0.0408   | 0.250    | J                    | U                      | Detected in method blank   | Detected at 0.0654     | False positive                 |
|                                  |                          | Barium              | 0.0091        | mg/l  | 0.0075   | 0.0150   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-112-092018-10.5-11.0-(10) | 1810318-36               | Cadmium             | 0.0044        | mg/l  | 0.0006   | 0.0100   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Selenium            | 0.0576        | mg/l  | 0.0408   | 0.250    | J                    | U                      | Detected in method blank   | Detected at 0.0654     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0048        | mg/l  | 0.0024   | 0.0250   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-112-092018-17.0-18.0-(10) | 1810318-38               | Selenium            | 0.0855        | mg/l  | 0.0408   | 0.250    | J                    | U                      | Detected in method blank   | Detected at 0.0654     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0035        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0007     | False positive                 |
| SO-PTC-104-092018-13.4-13.9-(10) | 1810318-40               | Chromium, Total     | 0.0031        | mg/l  | 0.0024   | 0.0250   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Lead and Compounds  | 0.0151        | mg/l  | 0.0065   | 0.100    | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000016      | mg/l  | 0.000007 | 0.000100 | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Selenium            | 0.0776        | mg/l  | 0.0408   | 0.250    | J                    | U                      | Detected in method blank   | Detected at 0.0654     | False positive                 |
|                                  |                          | Barium              | 0.0263        | mg/l  | 0.0149   | 0.0300   | J, D                 | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-104-092018-14.2-14.7-(10) | 1810318-42               | Chromium, Total     | 0.0304        | mg/l  | 0.0047   | 0.0500   | J, D                 | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000050      | mg/l  | 0.000007 | 0.000100 | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Selenium            | 0.0860        | mg/l  | 0.0816   | 0.500    | J, D                 | U                      | Detected in method blank   | Detected at 0.0654     | False positive                 |
|                                  |                          | Barium              | 0.102         | mg/l  | 0.0075   | 0.0150   | J, B                 | U                      | Detected in method blank   | Detected at 0.102      | False positive                 |
| SO-PTC-120-092118-9.0-10.0-(10)  | 1810334-02               | Cadmium             | 0.0053        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0041     | False positive                 |
|                                  |                          | Mercury (elemental) | 0.000007      | mg/l  | 0.000007 | 0.000100 | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Barium              | 0.102         | mg/l  | 0.0075   | 0.0150   | B                    | U                      | Detected in method blank   | Detected at 0.102      | False positive                 |
| SO-PTC-120-092118-11.0-12.0-(10) | 1810334-04               | Cadmium             | 0.0041        | mg/l  | 0.0006   | 0.0100   | J                    | U                      | Detected in method blank   | Detected at 0.0041     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0044        | mg/l  | 0.0024   | 0.0250   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Barium              | 0.118         | mg/l  | 0.0075   | 0.0150   | B                    | U                      | Detected in method blank   | Detected at 0.102      | False positive                 |
| SO-PTC-108-092118-12.0-12.5-(10) | 1810334-06               | Cadmium             | 0.0171        | mg/l  | 0.0006   | 0.0100   | U                    | U                      | Detected in method blank   | Detected at 0.0041     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0029        | mg/l  | 0.0024   | 0.025    | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000008      | mg/l  | 0.000007 | 0.0001   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Barium              | 0.142         | mg/l  | 0.0075   | 0.0150   | B                    | U                      | Detected in method blank   | Detected at 0.102      | False positive                 |
| SO-PTC-108-092118-13.2-14.2-(10) | 1810334-08               | Cadmium             | 0.0146        | mg/l  | 0.0006   | 0.0100   | U                    | U                      | Detected in method blank   | Detected at 0.0041     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0079        | mg/l  | 0.0024   | 0.0250   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Barium              | 0.181         | mg/l  | 0.0075   | 0.0150   | B                    | U                      | Detected in method blank   | Detected at 0.102      | False positive                 |
| SO-PTC-102-092118-7.5-8.5-(10)   | 1810334-10               | Chromium, Total     | 0.0051        | mg/l  | 0.0024   | 0.0250   | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |



Table 2, continued

| Sample Number*                   | Laboratory Sample Number | Chemical            | Concentration | Units | MDL      | RL       | Laboratory Data Flag | Validation Qualifier | Quality Control Reason     | Quality Control Result | Possible Bias <sup>b,c,d</sup> |
|----------------------------------|--------------------------|---------------------|---------------|-------|----------|----------|----------------------|----------------------|----------------------------|------------------------|--------------------------------|
| SO-PTC-102-092118-14.5-15.0-(10) | 1810334-12               | Barium              | 0.291         | mg/l  | 0.0149   | 0.0300   | D, B                 | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Chromium, Total     | 0.0192        | mg/l  | 0.0047   | 0.0500   | J, D                 | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-103-092118-7.5-8.5-(10)   | 1810334-14               | Barium              | 0.121         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Lead and Compounds  | 0.0160        | mg/l  | 0.0065   | 0.100    | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000039      | mg/l  | 0.000007 | 0.000100 | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-103-092118-12.8-13.8-(10) | 1810334-16               | Barium              | 0.137         | mg/l  | 0.0149   | 0.0300   | D, B                 | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Lead and Compounds  | 0.0239        | mg/l  | 0.0130   | 0.200    | J, D                 | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000043      | mg/l  | 0.000007 | 0.000100 | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-109-092418-5.0-6.0-(10)   | 1810353-02               | Barium              | 0.102         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Chromium, Total     | 0.0066        | mg/l  | 0.0024   | 0.0250   | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-109-092418-13.0-14.0-(10) | 1810353-03               | Barium              | 0.113         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
| SO-PTC-107-092418-6.0-7.0-(10)   | 1810353-06               | Barium              | 0.102         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Cadmium             | 0.0091        | mg/l  | 0.0006   | 0.0100   | J                    | U                    | Detected in method blank   | Detected at 0.0041     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0039        | mg/l  | 0.0024   | 0.0250   | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-107-092418-11.0-12.0-(10) | 1810353-08               | Barium              | 0.183         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Cadmium             | 0.0041        | mg/l  | 0.0006   | 0.0100   | J                    | U                    | Detected in method blank   | Detected at 0.0041     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0156        | mg/l  | 0.0024   | 0.0250   | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000007      | mg/l  | 0.000007 | 0.000100 | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| EB-01-092418-(10)                | 1810353-10               | Arsenic, Inorganic  | 0.0178        | mg/l  | 0.0140   | 0.250    | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Barium              | 0.0786        | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.0786     | False positive                 |
|                                  |                          | Cadmium             | 0.0026        | mg/l  | 0.0006   | 0.0100   | J                    | U                    | Detected in method blank   | Detected at 0.0041     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0037        | mg/l  | 0.0024   | 0.0250   | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Silver              | 0.0024        | mg/l  | 0.0022   | 0.0150   | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-106-092418-7.0-8.0-(10)   | 1810353-12               | Barium              | 0.102         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Mercury (elemental) | 0.000010      | mg/l  | 0.000007 | 0.000100 | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-106-092418-13.0-14.0-(10) | 1810353-14               | Barium              | 0.112         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Chromium, Total     | 0.0157        | mg/l  | 0.0024   | 0.0250   | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-105-092418-8.0-9.0-(10)   | 1810353-16               | Barium              | 0.137         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Cadmium             | 0.0116        | mg/l  | 0.0006   | 0.0100   | J                    | U                    | Detected in method blank   | Detected at 0.0041     | False positive                 |
| SO-PTC-105-092418-(11)           | 1810353-18               | Barium              | 0.324         | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.102      | False positive                 |
|                                  |                          | Cadmium             | 0.0108        | mg/l  | 0.0006   | 0.0100   | J                    | U                    | Detected in method blank   | Detected at 0.0041     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0081        | mg/l  | 0.0024   | 0.0250   | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
| SO-PTC-105-092418-13.0-14.0-(10) | 1810353-20               | Barium              | 0.0786        | mg/l  | 0.0075   | 0.0150   | B                    | U                    | Detected in method blank   | Detected at 0.0786     | False positive                 |
|                                  |                          | Chromium, Total     | 0.0145        | mg/l  | 0.0024   | 0.0250   | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |
|                                  |                          | Mercury (elemental) | 0.000015      | mg/l  | 0.000007 | 0.000100 | J                    | J                    | Concentration is >MDL, <RL | NA                     | Low or high                    |

Table 2, continued

| Sample Number*              | Laboratory Sample Number | Chemical           | Concentration | Units | MDL   | RL   | Laboratory Data Flag | Validation n Qualifier | Quality Control Reason     | Quality Control Result | Possible Bias <sup>b,c,d</sup> |
|-----------------------------|--------------------------|--------------------|---------------|-------|-------|------|----------------------|------------------------|----------------------------|------------------------|--------------------------------|
| <b>Soil Samples</b>         |                          |                    |               |       |       |      |                      |                        |                            |                        |                                |
| SO-PTC-125-091718-12.0-13.0 | 1810270-15               | Arsenic, Inorganic | 6.86          | mg/kg | 0.792 | 8.42 | J                    | J                      | Concentration is >MDL, <RL | NA                     | Low or high                    |

Notes:  
 B- analyte detected in method blank per lab specific criteria only  
 D- reported value is from a dilution  
 J - estimated  
 MDL - method detection limit  
 R - rejected  
 RL - reporting limit  
 TCLP - toxicity characteristic leaching procedure  
 U - undetected at detection limit shown

|                                |    |
|--------------------------------|----|
| Total results qualified "J" =  | 67 |
| Total results qualified "U" =  | 84 |
| Total results qualified "UJ" = | 0  |
| Total results qualified "R" =  | 0  |

<sup>a</sup> Summary of qualified data is for natural and field quality control samples only  
<sup>b</sup>Low bias - concentration reported is exhibits low bias and the actual reporting limit or concentration may be greater than reported  
<sup>c</sup>High bias - result reported exhibits high bias and the actual reporting limit or concentration may be lower than reported  
<sup>d</sup>False positive - compound is likely not present



03 October 2018

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

18I0270

Associated SDG ID(s)

N/A

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I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|  |  |                  |
|--|--|------------------|
| ARI Assigned Number:<br><b>1810270</b>                 | Turn-around Requested:<br>Normal           | Date:<br>9/18/18 |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700                     | Page:<br>1 of 3  |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) | No. of Coolers:<br>Cooler Temps:<br>2, 30C |                  |

|  |                                     |                                       |   |                     |                                 |  |                |
|--|-------------------------------------|---------------------------------------|---|---------------------|---------------------------------|--|----------------|
| Client Project Name:<br>Arkema FS DG Inv | Analysis Requested                  |                                       |   |                     |                                 |  | Notes/Comments |
| Client Project #:<br>79227               | Samplers:<br>DG Cooper 206-660-3466 | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |                |

| Sample ID                        | Date    | Time | Matrix | No. Containers | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |  |  |  |  |  |
|----------------------------------|---------|------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|--|--|--|--|--|
| SO-PTC-122-091818-2.03.0         | 9/18/18 | 0930 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-122-091818-2.0-3.0-4.0    | 9/18/18 | 0930 | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-122-091818-9.5-10.5       | 9/18/18 | 1000 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-122-091818-9.5-10.5-(10)  | 9/18/18 | 1000 | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-123-091718-3.5-4.0        | 9/17/18 | 1500 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-123-091718-3.5-4.0-(10)   | 9/17/18 | 1500 | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-123-091718-13.0-14.0      | 9/17/18 | 1530 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-123-091718-13.0-14.0-(10) | 9/17/18 | 1530 | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-124-091718-8.5-9.5        | 9/17/18 | 1230 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |  |
| SO-PTC-124-091718-8.5-9.5-(10)   | 9/17/18 | 1230 | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |  |

|   |                                  |                                 |                                 |                             |
|---|----------------------------------|---------------------------------|---------------------------------|-----------------------------|
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature)  | Received by:<br>(Signature)     | Relinquished by:<br>(Signature) | Received by:<br>(Signature) |
|   | Printed Name:<br>ANTHONY CERRUTI | Printed Name:<br>Jasmine Bowman | Printed Name:                   | Printed Name:               |
|   | Company:<br>DOF                  | Company:<br>ARI                 | Company:                        | Company:                    |
|   | Date & Time:<br>9/18/18 1657     | Date & Time:<br>9/18/18 1657    | Date & Time:                    | Date & Time:                |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|  |                                      |                            |
|--|--------------------------------------|----------------------------|
| ARI Assigned Number:                                       | Turn-around Requested: <b>Normal</b> | Date: <b>9/18/18</b>       |
| ARI Client Company: <b>Pioneer Technologies</b>            | Phone: <b>360-570-1700</b>           | Page: <b>2</b> of <b>3</b> |
| Client Contact: <b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers:                      | Cooler Temps:              |

| Client Project Name:  |                               |      |                              |                | Analysis Requested                    |   |                     |                                 |  |  |  |  | Notes/Comments |  |
|---|-------------------------------|------|------------------------------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|--|----------------|--|
| Client Project #:   |                               |      |                              |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |  |                |  |
| Samplers: DG Cooper 206-660-3466  |                               |      |                              |                |                                       |   |                     |                                 |  |  |  |  |                |  |
| Sample ID   | Date                          | Time | Matrix                       | No. Containers |                                       |   |                     |                                 |  |  |  |  |                |  |
| SO-PTC-124-091718-12.0-13.0   | 9/17/18                       | 1245 | SO                           | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |                |  |
| SO-PTC-124-091718-12.0-13.0-(10)  | 9/17/18                       | 1245 | SO                           | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |                |  |
| SO-PTC-125-091718-1.0-2.0   | 9/17/18                       | 1015 | SO                           | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |                |  |
| SO-PTC-125-091718-7.0-2.0-(10)  | 9/17/18                       | 1015 | SO                           | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |                |  |
| SO-PTC-125-091718-12.0-13.0   | 9/17/18                       | 1030 | SO                           | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |                |  |
| SO-PTC-125-091718-12.0-13.0-(10)  | 9/17/18                       | 1030 | SO                           | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |                |  |
| SO-PTC-127-091818-7.0-7.5   | 9/18/18                       | 1200 | SO                           | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |                |  |
| SO-PTC-127-091818-7.0-7.5-(10)  | 9/18/18                       | 1200 | SO                           | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |                |  |
| SO-PTC-127-091818-17.0-17.5   | 9/18/18                       | 1230 | SO                           | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |                |  |
| SO-PTC-127-091818-17.0-17.5-(10)  | 9/18/18                       | 1230 | SO                           | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |                |  |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by: (Signature)  |      | Received by: (Signature)     |                | Relinquished by: (Signature)          |   |                     | Received by: (Signature)        |  |  |  |  |                |  |
|   | Printed Name: ANTHONY CERANTI |      | Printed Name: Jasmine Bowman |                | Printed Name:                         |   |                     | Printed Name:                   |  |  |  |  |                |  |
|   | Company: DIF                  |      | Company: ARI                 |                | Company:                              |   |                     | Company:                        |  |  |  |  |                |  |
|   | Date & Time: 1657             |      | Date & Time: 9/18/18 1657    |                | Date & Time:                          |   |                     | Date & Time:                    |  |  |  |  |                |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

|  |                                      |                            |
|--|--------------------------------------|----------------------------|
| ARI Assigned Number:                                       | Turn-around Requested: <b>Normal</b> | Date: <b>9/18/18</b>       |
| ARI Client Company: <b>Pioneer Technologies</b>            | Phone: <b>360-570-1700</b>           | Page: <b>3</b> of <b>3</b> |
| Client Contact: <b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers:                      | Cooler Temps:              |



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

| Client Project Name:   |                                      |                                     |        |                | Analysis Requested                    |   |                     |                                 |                          |  |  | Notes/Comments |  |
|--|--------------------------------------|-------------------------------------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--------------------------|--|--|----------------|--|
| Client Project #: <b>79227</b>   |                                      |                                     |        |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |                          |  |  |                |  |
| Sample ID  | Date                                 | Time                                | Matrix | No. Containers |                                       |   |                     |                                 |                          |  |  |                |  |
| SO-PTC-110-091818-11-12  | 9/18/18                              | 1415                                | SO     | 1-8oz          | X                                     |   | X                   |                                 |                          |  |  |                |  |
| SO-PTC-110-091818-11-12(10)  | 9/18/18                              | 1415                                | SO     | 1-4oz.         |                                       | X   |                     |                                 |                          |  |  |                |  |
| SO-PTC-110-091818-16-17  | 9/18/18                              | 1430                                | SO     | 1-8oz          | X                                     |   | X                   |                                 |                          |  |  |                |  |
| SO-PTC-110-091818-16-17-(10)   | 9/18/18                              | 1430                                | SO     | 1-4oz.         |                                       | X   |                     |                                 |                          |  |  |                |  |
| SO-PTC-126-091818-9-10   | 9/18/18                              | 1530                                | SO     | 1-8oz          | X                                     |   | X                   |                                 |                          |  |  |                |  |
| SO-PTC-126-091818-9-10-(10)  | 9/18/18                              | 1530                                | SO     | 1-4oz.         |                                       | X   |                     |                                 |                          |  |  |                |  |
| SO-PTC-126-091818-13.5-14  | 9/18/18                              | 1600                                | SO     | 1-8oz          | X                                     |   | X                   |                                 |                          |  |  |                |  |
| SO-PTC-126-091818-13.5-14-(10)   | 9/18/18                              | 1600                                | SO     | 1-4oz.         |                                       | X   |                     |                                 |                          |  |  |                |  |
| Comments/Special Instructions  | Relinquished by: (Signature)         | Received by: (Signature)            |        |                | Relinquished by: (Signature)          |   |                     |                                 | Received by: (Signature) |  |  |                |  |
| Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Printed Name: <b>ANTHONY CERUZZI</b> | Printed Name: <b>Jasmine Berman</b> |        |                | Printed Name:                         |   |                     |                                 | Printed Name:            |  |  |                |  |
|  | Company: <b>DOF</b>                  | Company: <b>ARI</b>                 |        |                | Company:                              |   |                     |                                 | Company:                 |  |  |                |  |
|  | Date & Time: <b>9/18/18 1657</b>     | Date & Time: <b>9/18/18 1657</b>    |        |                | Date & Time:                          |   |                     |                                 | Date & Time:             |  |  |                |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-122-091818-2.0-3.0        | 18I0270-01    | Solid  | 18-Sep-2018 09:30 | 18-Sep-2018 16:57 |
| SO-PTC-122-091818-2.0-3.0-(10)   | 18I0270-02    | Solid  | 18-Sep-2018 09:30 | 18-Sep-2018 16:57 |
| SO-PTC-122-091818-9.5-10.5       | 18I0270-03    | Solid  | 18-Sep-2018 10:00 | 18-Sep-2018 16:57 |
| SO-PTC-122-091818-9.5-10.5-(10)  | 18I0270-04    | Solid  | 18-Sep-2018 10:00 | 18-Sep-2018 16:57 |
| SO-PTC-123-091718-3.5-4.0        | 18I0270-05    | Solid  | 17-Sep-2018 15:00 | 18-Sep-2018 16:57 |
| SO-PTC-123-091718-3.5-4.0-(10)   | 18I0270-06    | Solid  | 17-Sep-2018 15:00 | 18-Sep-2018 16:57 |
| SO-PTC-123-091718-13.0-14.0      | 18I0270-07    | Solid  | 17-Sep-2018 15:30 | 18-Sep-2018 16:57 |
| SO-PTC-123-091718-13.0-14.0-(10) | 18I0270-08    | Solid  | 17-Sep-2018 15:30 | 18-Sep-2018 16:57 |
| SO-PTC-124-091718-8.5-9.5        | 18I0270-09    | Solid  | 17-Sep-2018 12:30 | 18-Sep-2018 16:57 |
| SO-PTC-124-091718-8.5-9.5-(10)   | 18I0270-10    | Solid  | 17-Sep-2018 12:30 | 18-Sep-2018 16:57 |
| SO-PTC-124-091718-12.0-13.0      | 18I0270-11    | Solid  | 17-Sep-2018 12:45 | 18-Sep-2018 16:57 |
| SO-PTC-124-091718-12.0-13.0-(10) | 18I0270-12    | Solid  | 17-Sep-2018 12:45 | 18-Sep-2018 16:57 |
| SO-PTC-125-091718-1.0-2.0        | 18I0270-13    | Solid  | 17-Sep-2018 10:15 | 18-Sep-2018 16:57 |
| SO-PTC-125-091718-1.0-2.0-(10)   | 18I0270-14    | Solid  | 17-Sep-2018 10:15 | 18-Sep-2018 16:57 |
| SO-PTC-125-091718-12.0-13.0      | 18I0270-15    | Solid  | 17-Sep-2018 10:30 | 18-Sep-2018 16:57 |
| SO-PTC-125-091718-12.0-13.0-(10) | 18I0270-16    | Solid  | 17-Sep-2018 10:30 | 18-Sep-2018 16:57 |
| SO-PTC-127-091818-7.0-7.5        | 18I0270-17    | Solid  | 18-Sep-2018 12:00 | 18-Sep-2018 16:57 |
| SO-PTC-127-091818-7.0-7.5-(10)   | 18I0270-18    | Solid  | 18-Sep-2018 12:00 | 18-Sep-2018 16:57 |
| SO-PTC-127-091818-17.0-17.5      | 18I0270-19    | Solid  | 18-Sep-2018 12:30 | 18-Sep-2018 16:57 |
| SO-PTC-127-091818-17.0-17.5-(10) | 18I0270-20    | Solid  | 18-Sep-2018 12:30 | 18-Sep-2018 16:57 |
| SO-PTC-110-091818-11-12          | 18I0270-21    | Solid  | 18-Sep-2018 14:15 | 18-Sep-2018 16:57 |
| SO-PTC-110-091818-11-12-(10)     | 18I0270-22    | Solid  | 18-Sep-2018 14:15 | 18-Sep-2018 16:57 |
| SO-PTC-110-091818-16-17          | 18I0270-23    | Solid  | 18-Sep-2018 14:30 | 18-Sep-2018 16:57 |
| SO-PTC-110-091818-16-17-(10)     | 18I0270-24    | Solid  | 18-Sep-2018 14:30 | 18-Sep-2018 16:57 |
| SO-PTC-126-091818-9-10           | 18I0270-25    | Solid  | 18-Sep-2018 15:30 | 18-Sep-2018 16:57 |
| SO-PTC-126-091818-9-10-(10)      | 18I0270-26    | Solid  | 18-Sep-2018 15:30 | 18-Sep-2018 16:57 |
| SO-PTC-126-091818-13.5-14        | 18I0270-27    | Solid  | 18-Sep-2018 16:00 | 18-Sep-2018 16:57 |
| SO-PTC-126-091818-13.5-14-(10)   | 18I0270-28    | Solid  | 18-Sep-2018 16:00 | 18-Sep-2018 16:57 |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
03-Oct-2018 14:28

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 18, 2018 under ARI work order 1810270. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total Arsenic - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-122-091818-2.0-3.0. The matrix spike percent recovery and duplicate RPD were within QC limits.

### TCLP Metals

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank BGI0663 has Barium, Cadmium and Chromium detected below the reporting limits, but above the method detection limits. Method blank BGI0782 has Cadmium detected below the reporting limit, but above the method detection limit. These metals have been flagged with "J" qualifiers on the method blanks. There were no target metals detected above the reporting limits in the method blanks. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-122-091818-2.0-3.0-(10). The duplicate has Barium, Cadmium and Chromium concentrations  $\leq 5$  times reporting limits, and the replicate control limits default to  $\pm$  the reporting limit instead of 20% of the RPD. These metals have been flagged with "L" qualifiers on the duplicate. The results are advisory. All other matrix spike percent recoveries and duplicate RPD were within QC limits. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-125-091718-12.0-13.0-(10). The duplicate has a Chromium concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. The Chromium has been flagged with an "L" qualifier on the duplicate. The results are advisory. All other matrix spike percent recoveries and duplicate RPD were within QC limits. No further corrective action was taken.

### TCLP Hg

The samples were digested and analyzed within the recommended holding times.





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03-Oct-2018 14:28

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

A matrix spike and duplicate were prepared in conjunction with samples SO-PTC-122-091818-9.5-10.5-(10) and SO-PTC-127-091818-7.0-7.5-(10). The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **pH - EPA Method 9045A**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample SO-PTC-122-091818-2.0-3.0. The duplicate RPD was within QC limits.



# Cooler Receipt Form

ARI Client: DOF Pioneer Tech.

Project Name: Arkema FSDG Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 1870270

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 2.30C

Time: 1657

Temp Gun ID#: 0005206

If cooler temperature is out of compliance fill out form 00070F

Cooler Accepted by: HB Date: 9/18/18 Time: 1657

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...  NA  YES  NO

Were all VOC vials free of air bubbles? .....  NA  YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI .....  NA

Was Sample Split by ARI :  NA  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: ISW Date: 09/18/18 Time: 0750

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_ Date: \_\_\_\_\_

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-122-091818-2.0-3.0**  
**1810270-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/18/2018 09:30  
Instrument: ICP2 Analyst: MCB Analyzed: 21-Sep-2018 15:27

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.043 g (wet)  
Preparation Batch: BGI0485 Final Volume: 50 mL  
Prepared: 19-Sep-2018 Dry Weight: 0.85 g  
% Solids: 81.39

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.554           | 5.89            | 353    | mg/kg |       |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-122-091818-2.0-3.0**  
**1810270-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2018 09:30

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.3 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>9.15</b> | pH Units |       |



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Reported:  
03-Oct-2018 14:28

**SO-PTC-122-091818-2.0-3.0-(10)**  
**18I0270-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 09:30

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 13:48

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0663 Sample Size: 25 mL (wet)  
Prepared: 25-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>4.23</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0167</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0008</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0065</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | <b>0.0087</b> | mg/L  | J     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-122-091818-2.0-3.0-(10)**  
**18I0270-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/18/2018 09:30

Instrument: CVAA Analyst: DP

Analyzed: 27-Sep-2018 08:07

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0664

Sample Size: 20 mL (wet)

Prepared: 25-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-122-091818-9.5-10.5**  
**1810270-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/18/2018 10:00  
Instrument: ICP2 Analyst: MCB Analyzed: 25-Sep-2018 12:41

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.50 g  
Preparation Batch: BGI0485 % Solids: 48.07  
Prepared: 19-Sep-2018 Sample Size: 1.033 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.947           | 10.1            | <b>3760</b> | mg/kg |       |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-122-091818-9.5-10.5**  
**1810270-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2018 10:00

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.8 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.07</b> | pH Units |       |





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Reported:  
03-Oct-2018 14:28

**SO-PTC-122-091818-9.5-10.5-(10)**  
**1810270-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 10:00

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 15:03

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0663 Sample Size: 25 mL (wet)  
Prepared: 25-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | 7.55   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | 0.0267 | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND     | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND     | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND     | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND     | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND     | mg/L  | U     |



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03-Oct-2018 14:28

**SO-PTC-122-091818-9.5-10.5-(10)**  
**18I0270-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/18/2018 10:00

Instrument: CVAA Analyst: DP

Analyzed: 27-Sep-2018 08:09

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0664

Sample Size: 20 mL (wet)

Prepared: 25-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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03-Oct-2018 14:28

**SO-PTC-123-091718-3.5-4.0**  
**18I0270-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 15:00

Instrument: ICP2 Analyst: MCB

Analyzed: 25-Sep-2018 12:45

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.065 g (wet)

Final Volume: 50 mL

Dry Weight: 0.92 g

% Solids: 85.95

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.513           | 5.46            | <b>646</b> | mg/kg |       |



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03-Oct-2018 14:28

**SO-PTC-123-091718-3.5-4.0**  
**1810270-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/17/2018 15:00

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.34 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.55</b> | pH Units |       |



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03-Oct-2018 14:28

**SO-PTC-123-091718-3.5-4.0-(10)**  
**18I0270-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 15:00

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 15:07

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0663 Sample Size: 25 mL (wet)  
Prepared: 25-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>2.65</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0724</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0013</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-123-091718-3.5-4.0-(10)**  
**18I0270-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/17/2018 15:00

Instrument: CVAA Analyst: DP

Analyzed: 27-Sep-2018 08:16

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0664

Sample Size: 20 mL (wet)

Prepared: 25-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000015</b> | mg/L  | J     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-123-091718-13.0-14.0**  
**18I0270-07 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 15:30

Instrument: ICP2 Analyst: MCB

Analyzed: 25-Sep-2018 12:49

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.033 g (wet)

Final Volume: 50 mL

Dry Weight: 0.46 g

% Solids: 44.58

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 1.02            | 10.9            | <b>4560</b> | mg/kg |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-123-091718-13.0-14.0**  
**18I0270-07 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/17/2018 15:30

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.2 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | 5.35   | pH Units |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**SO-PTC-123-091718-13.0-14.0-(10)**  
**1810270-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 15:30

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 15:12

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0663 Sample Size: 25 mL (wet)  
Prepared: 25-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>8.80</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0357</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-123-091718-13.0-14.0-(10)**  
**18I0270-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/17/2018 15:30

Instrument: CVAA Analyst: DP

Analyzed: 27-Sep-2018 08:18

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0664

Sample Size: 20 mL (wet)

Prepared: 25-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-124-091718-8.5-9.5**  
**18I0270-09 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 12:30

Instrument: ICP2 Analyst: MCB

Analyzed: 25-Sep-2018 12:53

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.037 g (wet)

Final Volume: 50 mL

Dry Weight: 0.71 g

% Solids: 68.28

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.664           | 7.06            | <b>1210</b> | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-124-091718-8.5-9.5**  
**18I0270-09 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/17/2018 12:30

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.76 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>5.91</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**SO-PTC-124-091718-8.5-9.5-(10)**  
**18I0270-10 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 12:30

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 15:16

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0663 Sample Size: 25 mL (wet)  
Prepared: 25-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.366</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0283</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0016</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-124-091718-8.5-9.5-(10)**  
**18I0270-10 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/17/2018 12:30

Instrument: CVAA Analyst: DP

Analyzed: 27-Sep-2018 08:20

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0664

Sample Size: 20 mL (wet)

Prepared: 25-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-124-091718-12.0-13.0**  
**18I0270-11 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 12:45

Instrument: ICP2 Analyst: MCB

Analyzed: 25-Sep-2018 13:15

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.003 g (wet)

Final Volume: 50 mL

Dry Weight: 0.58 g

% Solids: 57.38

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.817           | 8.69            | 23.7   | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-124-091718-12.0-13.0**  
**18I0270-11 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/17/2018 12:45

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.11 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | 7.22   | pH Units |       |





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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**SO-PTC-124-091718-12.0-13.0-(10)**  
**18I0270-12 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 12:45

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 15:20

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0663 Sample Size: 25 mL (wet)  
Prepared: 25-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.0142</b> | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0656</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0007</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0098</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | <b>0.0079</b> | mg/L  | J     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-124-091718-12.0-13.0-(10)**  
**18I0270-12 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/17/2018 12:45

Instrument: CVAA Analyst: DP

Analyzed: 27-Sep-2018 08:27

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0664

Sample Size: 20 mL (wet)

Prepared: 25-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-125-091718-1.0-2.0**  
**18I0270-13 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 10:15

Instrument: ICP2 Analyst: MCB

Analyzed: 25-Sep-2018 13:20

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.005 g (wet)

Final Volume: 50 mL

Dry Weight: 0.90 g

% Solids: 89.78

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.521           | 5.54            | <b>45.6</b> | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-125-091718-1.0-2.0**  
**18I0270-13 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/17/2018 10:15

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.25 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.90</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**SO-PTC-125-091718-1.0-2.0-(10)**  
**18I0270-14 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 10:15

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 15:24

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0663 Sample Size: 25 mL (wet)  
Prepared: 25-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.0335</b> | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0427</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0035</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | <b>0.0106</b> | mg/L  | J     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-125-091718-1.0-2.0-(10)**  
**18I0270-14 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/17/2018 10:15

Instrument: CVAA Analyst: DP

Analyzed: 27-Sep-2018 08:31

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0664

Sample Size: 20 mL (wet)

Prepared: 25-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-125-091718-12.0-13.0**  
**18I0270-15 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 10:30

Instrument: ICP2 Analyst: MCB

Analyzed: 25-Sep-2018 13:23

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.026 g (wet)

Final Volume: 50 mL

Dry Weight: 0.59 g

% Solids: 57.85

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.792           | 8.42            | <b>6.86</b> | mg/kg | J     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-125-091718-12.0-13.0**  
**18I0270-15 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/17/2018 10:30

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.05 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | 7.11   | pH Units |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**SO-PTC-125-091718-12.0-13.0-(10)**  
**1810270-16 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/17/2018 10:30

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 15:54

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | ND            | mg/L  | U     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0105</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0022</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-125-091718-12.0-13.0-(10)**  
**18I0270-16 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/17/2018 10:30

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 11:54

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-127-091818-7.0-7.5**  
**18I0270-17 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 12:00

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 15:29

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.074 g (wet)

Final Volume: 50 mL

Dry Weight: 0.75 g

% Solids: 70.04

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.625           | 6.65            | 933    | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-127-091818-7.0-7.5**  
**1810270-17 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2018 12:00

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.08 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>10.1</b> | pH Units |       |



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Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**SO-PTC-127-091818-7.0-7.5-(10)**  
**18I0270-18 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 12:00

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 15:24

Sample Preparation:

Preparation Method: LEN Digestion of EPA 1311 Elutriate

Preparation Batch: BGI0782

Sample Size: 25 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.165</b>  | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0083</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0037</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-127-091818-7.0-7.5-(10)**  
**18I0270-18 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/18/2018 12:00

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 11:56

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000190</b> | mg/L  |       |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-127-091818-17.0-17.5**  
**18I0270-19 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/18/2018 12:30  
Instrument: ICP2 Analyst: MCB Analyzed: 26-Sep-2018 15:33

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.003 g (wet) Dry Weight: 0.59 g  
Preparation Batch: BGI0485 Final Volume: 50 mL % Solids: 58.45  
Prepared: 19-Sep-2018

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.802           | 8.53            | <b>984</b> | mg/kg |       |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-127-091818-17.0-17.5**  
**18I0270-19 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2018 12:30

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.79 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.67</b> | pH Units |       |





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Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**SO-PTC-127-091818-17.0-17.5-(10)**  
**1810270-20 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 12:30

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 15:28

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>38.3</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0468</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0038</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0240</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-127-091818-17.0-17.5-(10)**  
**18I0270-20 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/18/2018 12:30

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:03

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-110-091818-11-12**  
**18I0270-21 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 14:15

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 15:37

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.041 g (wet)

Final Volume: 50 mL

Dry Weight: 0.88 g

% Solids: 84.76

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.533           | 5.67            | <b>295</b> | mg/kg |       |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-110-091818-11-12**  
**1810270-21 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2018 14:15

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.25 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.92</b> | pH Units |       |



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Reported:  
03-Oct-2018 14:28

**SO-PTC-110-091818-11-12-(10)**  
**18I0270-22 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 14:15

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 15:32

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.485</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0230</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0025</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | <b>0.0086</b> | mg/L  | J     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-110-091818-11-12-(10)**  
**18I0270-22 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/18/2018 14:15

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:05

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-110-091818-16-17**  
**18I0270-23 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/18/2018 14:30  
Instrument: ICP2 Analyst: MCB Analyzed: 27-Sep-2018 16:52

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.48 g  
Preparation Batch: BGI0485 % Solids: 45.96  
Prepared: 19-Sep-2018 Sample Size: 1.044 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 2.45            | 26.1            | <b>9300</b> | mg/kg | D     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-110-091818-16-17**  
**18I0270-23 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2018 14:30

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.09 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.84</b> | pH Units |       |





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Reported:  
03-Oct-2018 14:28

**SO-PTC-110-091818-16-17-(10)**  
**18I0270-24 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 14:30

Instrument: ICP2 Analyst: TCH

Analyzed: 02-Oct-2018 16:59

Sample Preparation:

Preparation Method: LEN Digestion of EPA 1311 Elutriate

Preparation Batch: BGI0782

Sample Size: 25 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 10       | 0.0280          | 0.500           | <b>135</b>    | mg/L  | D     |
| Barium   | 7440-39-3  | 10       | 0.0149          | 0.0300          | <b>0.0289</b> | mg/L  | J, D  |
| Cadmium  | 7440-43-9  | 10       | 0.0012          | 0.0200          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 10       | 0.0047          | 0.0500          | <b>0.0213</b> | mg/L  | J, D  |
| Lead     | 7439-92-1  | 10       | 0.0130          | 0.200           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 10       | 0.0816          | 0.500           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 10       | 0.0044          | 0.0300          | <b>0.0048</b> | mg/L  | J, D  |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-110-091818-16-17-(10)**  
**18I0270-24 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/18/2018 14:30

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:07

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000020</b> | mg/L  | J     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-126-091818-9-10**  
**1810270-25 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 15:30

Instrument: ICP2 Analyst: MCB

Analyzed: 26-Sep-2018 16:43

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0485

Prepared: 19-Sep-2018

Sample Size: 1.032 g (wet)

Final Volume: 50 mL

Dry Weight: 0.79 g

% Solids: 76.25

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.597           | 6.35            | <b>307</b> | mg/kg |       |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-126-091818-9-10**  
**1810270-25 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2018 15:30

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.53 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.94</b> | pH Units |       |



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Reported:  
03-Oct-2018 14:28

**SO-PTC-126-091818-9-10-(10)**  
**18I0270-26 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 15:30

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 15:41

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>2.91</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0141</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0038</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-126-091818-9-10-(10)**  
**18I0270-26 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/18/2018 15:30

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:10

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
03-Oct-2018 14:28

**SO-PTC-126-091818-13.5-14**  
**18I0270-27 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/18/2018 16:00  
Instrument: ICP2 Analyst: MCB Analyzed: 26-Sep-2018 16:47

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.043 g (wet) Dry Weight: 0.70 g  
Preparation Batch: BGI0485 Final Volume: 50 mL % Solids: 66.92  
Prepared: 19-Sep-2018

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.673           | 7.16            | <b>423</b> | mg/kg |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-126-091818-13.5-14**  
**1810270-27 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2018 16:00

Instrument: Accumet AR60 Analyst: WCW

Analyzed: 20-Sep-2018 12:23

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0539

Prepared: 20-Sep-2018

Sample Size: 20.72 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | 5.62   | pH Units |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**SO-PTC-126-091818-13.5-14-(10)**  
**1810270-28 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/18/2018 16:00

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 15:45

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.397</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0348</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0034</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**SO-PTC-126-091818-13.5-14-(10)**  
**18I0270-28 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/18/2018 16:00

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:12

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**Metals and Metallic Compounds - Quality Control**

**Batch BGI0485 - SWC EPA 3050B**

Instrument: ICP2 Analyst: MCB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BGI0485-BLK1)</b>       |        |                 |                 |       |             | Prepared: 19-Sep-2018 Analyzed: 21-Sep-2018 15:14                    |      |             |      |           |       |
| Arsenic                           | ND     | 0.470           | 5.00            | mg/kg |             |  |      |             |      |           | U     |
| <b>LCS (BGI0485-BS1)</b>          |        |                 |                 |       |             | Prepared: 19-Sep-2018 Analyzed: 21-Sep-2018 15:18                    |      |             |      |           |       |
| Arsenic                           | 183    | 0.470           | 5.00            | mg/kg | 200         |  | 91.6 | 80-120      |      |           |       |
| <b>Duplicate (BGI0485-DUP1)</b>   |        |                 |                 |       |             | Source: 18I0270-01 Prepared: 19-Sep-2018 Analyzed: 21-Sep-2018 15:31 |      |             |      |           |       |
| Arsenic                           | 355    | 0.552           | 5.87            | mg/kg |             | 353  |      |             | 0.53 | 20        |       |
| <b>Matrix Spike (BGI0485-MS1)</b> |        |                 |                 |       |             | Source: 18I0270-01 Prepared: 19-Sep-2018 Analyzed: 21-Sep-2018 15:35 |      |             |      |           |       |
| Arsenic                           | 566    | 0.551           | 5.86            | mg/kg | 234         | 353  | 90.8 | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGI0663 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: MCB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|------|-------------|-------|-----------|-------|
| <b>Blank (BGI0663-BLK1)</b>       |        |                 |                 |       |             | Prepared: 25-Sep-2018 Analyzed: 26-Sep-2018 13:18                    |      |             |       |           |       |
| Arsenic                           | ND     | 0.0140          | 0.250           | mg/L  |             |  |      |             |       |           | U     |
| Barium                            | 0.0107 | 0.0075          | 0.0150          | mg/L  |             |  |      |             |       |           | J     |
| Cadmium                           | 0.0021 | 0.0006          | 0.0100          | mg/L  |             |  |      |             |       |           | J     |
| Chromium                          | 0.0054 | 0.0024          | 0.0250          | mg/L  |             |  |      |             |       |           | J     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             |  |      |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250           | mg/L  |             |  |      |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             |  |      |             |       |           | U     |
| <b>Duplicate (BGI0663-DUP1)</b>   |        |                 |                 |       |             | Source: 18I0270-02 Prepared: 25-Sep-2018 Analyzed: 26-Sep-2018 13:52 |      |             |       |           |       |
| Arsenic                           | 4.28   | 0.0140          | 0.250           | mg/L  |             | 4.23   |      |             | 1.03  | 20        |       |
| Barium                            | 0.0109 | 0.0075          | 0.0150          | mg/L  |             | 0.0167   |      |             | 41.90 | 20        | L, J  |
| Cadmium                           | 0.0016 | 0.0006          | 0.0100          | mg/L  |             | 0.0008   |      |             | 68.40 | 20        | L, J  |
| Chromium                          | 0.0038 | 0.0024          | 0.0250          | mg/L  |             | 0.0065   |      |             | 52.80 | 20        | L, J  |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             | 0.0087   |      |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250           | mg/L  |             | ND   |      |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             | ND   |      |             |       |           | U     |
| <b>Matrix Spike (BGI0663-MS1)</b> |        |                 |                 |       |             | Source: 18I0270-02 Prepared: 25-Sep-2018 Analyzed: 26-Sep-2018 13:56 |      |             |       |           |       |
| Arsenic                           | 8.11   | 0.0140          | 0.250           | mg/L  | 4.00        | 4.23   | 96.9 | 75-125      |       |           |       |
| Barium                            | 3.92   | 0.0075          | 0.0150          | mg/L  | 4.00        | 0.0167   | 97.6 | 75-125      |       |           |       |
| Cadmium                           | 1.01   | 0.0006          | 0.0100          | mg/L  | 1.00        | 0.0008   | 101  | 75-125      |       |           |       |
| Chromium                          | 1.04   | 0.0024          | 0.0250          | mg/L  | 1.00        | 0.0065   | 103  | 75-125      |       |           |       |
| Lead                              | 4.06   | 0.0065          | 0.100           | mg/L  | 4.00        | 0.0087   | 101  | 75-125      |       |           |       |
| Selenium                          | 4.30   | 0.0408          | 0.250           | mg/L  | 4.00        | ND   | 108  | 75-125      |       |           |       |
| Silver                            | 1.04   | 0.0022          | 0.0150          | mg/L  | 1.00        | ND   | 104  | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGI0664 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte                 | Result  | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|-----------------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BGI0664-BLK1)</b>       |         |                 |                 |       |             | Prepared: 25-Sep-2018 Analyzed: 27-Sep-2018 08:04                    |      |             |     |           |       |
| Mercury                           | ND      | 0.000007        | 0.000100        | mg/L  |             |  |      |             |     |           | U     |
| <b>Duplicate (BGI0664-DUP1)</b>   |         |                 |                 |       |             | Source: 18I0270-04 Prepared: 25-Sep-2018 Analyzed: 27-Sep-2018 08:11 |      |             |     |           |       |
| Mercury                           | ND      | 0.000007        | 0.000100        | mg/L  |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BGI0664-MS1)</b> |         |                 |                 |       |             | Source: 18I0270-04 Prepared: 25-Sep-2018 Analyzed: 27-Sep-2018 08:13 |      |             |     |           |       |
| Mercury                           | 0.00119 | 0.000007        | 0.000100        | mg/L  | 0.00100     | ND   | 119  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
03-Oct-2018 14:28

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BG10782 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|------|-------------|-------|-----------|-------|
| <b>Blank (BG10782-BLK1)</b>       |        |                 |                 |       |             | Prepared: 28-Sep-2018 Analyzed: 01-Oct-2018 15:20                    |      |             |       |           |       |
| Arsenic                           | ND     | 0.0140          | 0.250           | mg/L  |             |  |      |             |       |           | U     |
| Barium                            | ND     | 0.0075          | 0.0150          | mg/L  |             |  |      |             |       |           | U     |
| Cadmium                           | 0.0029 | 0.0006          | 0.0100          | mg/L  |             |  |      |             |       |           | J     |
| Chromium                          | ND     | 0.0024          | 0.0250          | mg/L  |             |  |      |             |       |           | U     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             |  |      |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250           | mg/L  |             |  |      |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             |  |      |             |       |           | U     |
| <b>Duplicate (BG10782-DUP1)</b>   |        |                 |                 |       |             | Source: 18I0270-16 Prepared: 28-Sep-2018 Analyzed: 01-Oct-2018 15:50 |      |             |       |           |       |
| Arsenic                           | 0.0159 | 0.0140          | 0.250           | mg/L  |             | ND   |      |             |       |           | J     |
| Barium                            | ND     | 0.0075          | 0.0150          | mg/L  |             | 0.0105   |      |             |       |           | U     |
| Cadmium                           | 0.0016 | 0.0006          | 0.0100          | mg/L  |             | 0.0022   |      |             | 28.70 | 20        | L, J  |
| Chromium                          | ND     | 0.0024          | 0.0250          | mg/L  |             | ND   |      |             |       |           | U     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             | ND   |      |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250           | mg/L  |             | ND   |      |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             | ND   |      |             |       |           | U     |
| <b>Matrix Spike (BG10782-MS1)</b> |        |                 |                 |       |             | Source: 18I0270-16 Prepared: 28-Sep-2018 Analyzed: 01-Oct-2018 15:58 |      |             |       |           |       |
| Arsenic                           | 4.30   | 0.0140          | 0.250           | mg/L  | 4.00        | ND   | 108  | 75-125      |       |           |       |
| Barium                            | 4.12   | 0.0075          | 0.0150          | mg/L  | 4.00        | 0.0105   | 103  | 75-125      |       |           |       |
| Cadmium                           | 1.10   | 0.0006          | 0.0100          | mg/L  | 1.00        | 0.0022   | 110  | 75-125      |       |           |       |
| Chromium                          | 1.07   | 0.0024          | 0.0250          | mg/L  | 1.00        | ND   | 107  | 75-125      |       |           |       |
| Lead                              | 4.20   | 0.0065          | 0.100           | mg/L  | 4.00        | ND   | 105  | 75-125      |       |           |       |
| Selenium                          | 4.44   | 0.0408          | 0.250           | mg/L  | 4.00        | ND   | 111  | 75-125      |       |           |       |
| Silver                            | 1.09   | 0.0022          | 0.0150          | mg/L  | 1.00        | ND   | 109  | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGI0783 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte                 | Result   | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|----------|-----------------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BGI0783-BLK1)</b>       |          |                 |                 |       |             | Prepared: 28-Sep-2018 Analyzed: 02-Oct-2018 11:47                    |      |             |      |           |       |
| Mercury                           | ND       | 0.000007        | 0.000100        | mg/L  |             |  |      |             |      |           | U     |
| <b>Duplicate (BGI0783-DUP1)</b>   |          |                 |                 |       |             | Source: 18I0270-18 Prepared: 28-Sep-2018 Analyzed: 02-Oct-2018 11:58 |      |             |      |           |       |
| Mercury                           | 0.000183 | 0.000007        | 0.000100        | mg/L  |             | 0.000190   |      |             | 3.64 | 20        |       |
| <b>Matrix Spike (BGI0783-MS1)</b> |          |                 |                 |       |             | Source: 18I0270-18 Prepared: 28-Sep-2018 Analyzed: 02-Oct-2018 12:00 |      |             |      |           |       |
| Mercury                           | 0.00126  | 0.000007        | 0.000100        | mg/L  | 0.00100     | 0.000190   | 107  | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**Wet Chemistry - Quality Control**

**Batch BGI0539 - EPA 9045D**

Instrument: Accumet AR60 Analyst: WCW

| QC Sample/Analyte               | Result | Detection Limit | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-----------------|----------|-------------|--|------|-------------|------|-----------|-------|
| <b>LCS (BGI0539-BS1)</b>        |        |                 |                 |          |             | Prepared: 20-Sep-2018 Analyzed: 20-Sep-2018 12:23                    |      |             |      |           |       |
| pH                              | 7.05   | 0.01            | 0.01            | pH Units | 7.00        |  | 101  | 0-200       |      |           |       |
| <b>Duplicate (BGI0539-DUP1)</b> |        |                 |                 |          |             | Source: 18I0270-01 Prepared: 20-Sep-2018 Analyzed: 20-Sep-2018 12:23 |      |             |      |           |       |
| pH                              | 9.18   | 0.01            | 0.01            | pH Units |             | 9.15   |      |             | 0.33 | 20        |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

**Certified Analyses included in this Report**

| Analyte                   | Certifications             |
|---------------------------|----------------------------|
| <b>EPA 6010C in Solid</b> |                            |
| Arsenic                   | NELAP,WADOE,DoD-ELAP,ADEC  |
| Silver                    | NELAP,WADOE,DoD-ELAP       |
| Arsenic                   | CALAP,NELAP,WADOE          |
| Barium                    | CALAP,NELAP,WADOE          |
| Cadmium                   | NELAP,WADOE,DoD-ELAP       |
| Chromium                  | NELAP,WADOE,DoD-ELAP       |
| Lead                      | NELAP,WADOE,DoD-ELAP       |
| Selenium                  | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 7470A in Solid</b> |                            |
| Mercury                   | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b> |                            |
| pH                        | WADOE,CALAP,DoD-ELAP,NELAP |

| Code     | Description  | Number       | Expires    |
|----------|--|--------------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | 17-015       | 02/07/2019 |
| CALAP    | California Department of Public Health CAELAP      | 2748         | 06/30/2019 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169        | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006-011 | 05/12/2019 |
| WADOE    | WA Dept of Ecology                                 | C558         | 06/30/2019 |
| WA-DW    | Ecology - Drinking Water                           | C558         | 06/30/2019 |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
03-Oct-2018 14:28

### Notes and Definitions

- D The reported value is from a dilution
- J Estimated concentration value detected below the reporting limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- U This analyte is not detected above the applicable reporting or detection limit.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



09 October 2018

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
18I0318

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|  |                                      |  |
|--|--------------------------------------|--|
| ARI Assigned Number: <b>18J0318</b>                        | Turn-around Requested: <b>Normal</b> | Date: <b>9/19/18</b> Ac <b>9/20/18</b>           |
| ARI Client Company: <b>Pioneer Technologies</b>            | Phone: <b>360-570-1700</b>           | Page: <b>1</b> of <b>2<sup>A</sup></b> p. 1 of 5 |
| Client Contact: <b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers:                      | Cooler Temps:                                    |

|  |                               |  |  |                |
|--|-------------------------------|--|--|----------------|
| Client Project Name: <b>Arkema FS DG Inv</b> | Analysis Requested            |  |  | Notes/Comments |
| Client Project #: <b>79227</b>               | Samplers: <b>A. CERRETTI</b>  |  |  |                |
|  | <b>DG Cooper 206-660-3466</b> |  |  |                |

| Sample ID                        | Date    | Time | Matrix | No. Containers | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |  |  |  |  |
|----------------------------------|---------|------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|--|--|--|--|
| SO-PTC-130-091918-9.5-10.0       | 9/19/18 | 0920 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| SO-PTC-130-091918-9.5-10.0-(10)  | 9/19/18 | 0920 | SO     | 1-4oz.         |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| SO-PTC-130-091918-11.0-11.5-(10) | 9/19/18 | 0940 | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| SO-PTC-130-091918-11.0-11.5      | 9/19/18 | 0940 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| SO-PTC-119-091918-6.0-6.5-(10)   | 9/19/18 | 1045 | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| SO-PTC-119-091918-6.0-6.5        | 9/19/18 | 1045 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| SO-PTC-119-091918-11.5-12.0-(10) | 9/19/18 | 1100 | SO     | 1-4oz.         |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| SO-PTC-119-091918-11.5-12.0      | 9/19/18 | 1100 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| SO-PTC-128-091918-6.0-6.5-(10)   | 9/19/18 | 1200 | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| SO-PTC-128-091918-6.0-6.5        | 9/19/18 | 1200 | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |

|   |                                  |  |                              |                          |
|---|----------------------------------|--|------------------------------|--------------------------|
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format<br>Bill to Port of Tacoma<br>PO#79227 | Relinquished By: (Signature)     | Received by: (Signature)               | Relinquished by: (Signature) | Received by: (Signature) |
|   | Printed Name: <b>A. CERRETTI</b> | Printed Name: <b>A. Jasmine Bowman</b> | Printed Name:                | Printed Name:            |
|   | Company: <b>DOF</b>              | Company: <b>ART</b>                    | Company:                     | Company:                 |
|   | Date & Time: <b>9/20/18 1730</b> | Date & Time: <b>9/20/18 1730</b>       | Date & Time:                 | Date & Time:             |

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# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 1870318 Turn-around Requested: Normal

ARI Client Company: Pioneer Technologies Phone: 360-570-1700

Client Contact: Troy Bussey (busseyt@uspioneer.com)

Client Project Name: Arkema FS DG Inv

Client Project #: 79227 Samplers: A. CERUTI  
DG Cooper 206-660-3466

Date: 9/19/18 AC 9/20/18

Page: 2 of 2 AC p. 2 of 5

No. of Coolers:          Cooler Temps:         



**Analytical Resources, Incorporated**  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)

| Sample ID   | Date                             | Time                                | Matrix | No. Containers                | Analysis Requested                    |   |                     |                                 |  |  | Notes/Comments |                 |
|---|----------------------------------|-------------------------------------|--------|-------------------------------|---------------------------------------|---|---------------------|---------------------------------|--|--|----------------|-----------------|
|   |                                  |                                     |        |                               | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |                |                 |
| SO-PTC-128-091918-7.5-8.0-(10)  | 9/19/18                          | 1215                                | SO     | 1-4oz                         |                                       | X   |                     |                                 |  |  |                |                 |
| SO-PTC-128-091918-7.5-8.0   | 9/19/18                          | 1215                                | SO     | 1-8oz                         | X                                     |   | X                   |                                 |  |  |                |                 |
| SO-PTC-116-091918-8.5-9.0-(10)  | 9/19/18                          | 1400                                | SO     | 1-4oz                         |                                       | X   |                     |                                 |  |  |                | TRACE HEAVY OIL |
| SO-PTC-116-091918-8.5-9.0   | 9/19/18                          | 1400                                | SO     | 1-8oz                         | X                                     |   | X                   |                                 |  |  |                | TRACE HEAVY OIL |
| SO-PTC-116-091918-13.1-13.6-(10)  | 9/19/18                          | 1430                                | SO     | 1-4oz                         |                                       | X   |                     |                                 |  |  |                |                 |
| SO-PTC-116-091918-13.1-13.6   | 9/19/18                          | 1430                                | SO     | 1-8oz                         | X                                     |   | X                   |                                 |  |  |                |                 |
| SO-PTC-115-091918-7.5-8.0-(10)  | 9/19/18                          | 1515                                | SO     | 1-4oz                         |                                       | X   |                     |                                 |  |  |                |                 |
| SO-PTC-115-091918-7.5-8.0   | 9/19/18                          | 1515                                | SO     | 1-8oz                         | X                                     |   | X                   |                                 |  |  |                |                 |
| SO-PTC-115-091918-14.5-15.0-(10)  | 9/19/18                          | 1530                                | SO     | 1-4oz                         |                                       | X   |                     |                                 |  |  |                |                 |
| SO-PTC-115-091918-14.5-15.0   | 9/19/18                          | 1530                                | SO     | 1-8oz                         | X                                     |   | X                   |                                 |  |  |                |                 |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by: (Signature)     | Received by: (Signature)            |        | Relinquished by: (Signature)  |                                       | Received by: (Signature)  |                     |                                 |  |  |                |                 |
|   | Printed Name: <u>A. CERUTI</u>   | Printed Name: <u>Jasmine Bowman</u> |        | Printed Name: <u>        </u> |                                       | Printed Name: <u>        </u>   |                     |                                 |  |  |                |                 |
|   | Company: <u>POF</u>              | Company: <u>ARTE</u>                |        | Company: <u>        </u>      |                                       | Company: <u>        </u>  |                     |                                 |  |  |                |                 |
|   | Date & Time: <u>9/20/18 1730</u> | Date & Time: <u>9/20/18 1730</u>    |        | Date & Time: <u>        </u>  |                                       | Date & Time: <u>        </u>  |                     |                                 |  |  |                |                 |

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# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|   |   |                               |
|---|---|-------------------------------|
| ARI Assigned Number:<br><b>1870318</b>                        | Turn-around Requested:<br><b>Normal</b> | Date:<br><b>9/20/18</b>       |
| ARI Client Company:<br><b>Pioneer Technologies</b>            | Phone:<br><b>360-570-1700</b>           | Page:<br><b>3</b> of <b>5</b> |
| Client Contact:<br><b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers:                         | Cooler Temps:                 |

| Client Project Name:<br><b>Arkema FS DG Inv</b>   |  |   |  |                | Analysis Requested                    |   |                     |                                 |  |  |  | Notes/Comments |  |
|---|--|---|--|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|----------------|--|
| Client Project #:<br><b>79227</b>   |  | Samplers: <b>A. CERUTI</b><br><b>DG Cooper 206-660-3466</b> |  |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |                |  |
| Sample ID   | Date   | Time  | Matrix   | No. Containers |                                       |   |                     |                                 |  |  |  |                |  |
| SO-PTC-114-092018-7.0-7.5   | 9/20/18  | 0915  | SO   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-114-092018-7.0-7.5-(10)  | 9/20/18  | 0915  | SO   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| SO-PTC-114-092018-13.3-13.8   | 09/20/18   | 0920  | SO   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-114-092018-13.3-13.8-(10)  | 9/20/18  | 0920  | SO   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| SO-PTC-118-092018-8.0-8.5   | 9/20/18  | 1045  | SO   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-118-092018-8.0-8.5-(10)  | 9/20/18  | 1045  | SO   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| SO-PTC-118-092018-10.5-11.0   | 9/20/18  | 1100  | SO   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-118-092018-10.5-11.0-(10)  | 9/20/18  | 1100  | SO   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| SO-PTC-117-092018-6.4-6.9   | 9/20/18  | 1145  | SO   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-117-092018-6.4-6.9-(10)  | 9/20/18  | 1145  | SO   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format<br>Bill to Port of Tacoma<br>PO#79227 | Relinquished by:<br>(Signature) <i>[Signature]</i> |   | Received by:<br>(Signature) <i>[Signature]</i> |                | Relinquished by:<br>(Signature)       |   |                     | Received by:<br>(Signature)     |  |  |  |                |  |
|   | Printed Name: <b>A. CERUTI</b>                     |   | Printed Name: <b>Jasmine Berman</b>            |                | Printed Name:                         |   |                     | Printed Name:                   |  |  |  |                |  |
|   | Company: <b>DOF</b>                                |   | Company: <b>ARI</b>                            |                | Company:                              |   |                     | Company:                        |  |  |  |                |  |
|   | Date & Time: <b>9/20/18 1730</b>                   |   | Date & Time: <b>9/20/18 1730</b>               |                | Date & Time:                          |   |                     | Date & Time:                    |  |  |  |                |  |

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# Chain of Custody Record & Laboratory Analysis Request

|   |   |                               |
|---|---|-------------------------------|
| ARI Assigned Number:<br><b>1810318</b>                        | Turn-around Requested:<br><b>Normal</b> | Date:<br><b>9/20/18</b>       |
| ARI Client Company:<br><b>Pioneer Technologies</b>            | Phone:<br><b>360-570-1700</b>           | Page:<br><b>4</b> of <b>5</b> |
| Client Contact:<br><b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers: <b>5</b> Cooler Temps:  |                               |



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

| Sample ID   | Date                            | Time                        | Matrix | No. Containers                  | Analysis Requested                    |  |                     |                                 |  |  |  | Notes/Comments |  |
|---|---------------------------------|-----------------------------|--------|---------------------------------|---------------------------------------|--|---------------------|---------------------------------|--|--|--|----------------|--|
|   |                                 |                             |        |                                 | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As,Ba,Cd,Cr,Pb,Hg,Se,Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |                |  |
| SO-PTC-117-092018-(01)  | 9/20/18                         | 1150                        | SO     | 1-8oz                           | X                                     |  | X                   |                                 |  |  |  |                |  |
| SO-PTC-117-092018-(11)  | 9/20/18                         | 1150                        | SO     | 1-4oz                           |                                       | X  |                     |                                 |  |  |  |                |  |
| SO-PTC-117-092018-14.5-15.0   | 9/20/18                         | 1200                        | SO     | 1-8oz                           | X                                     |  | X                   |                                 |  |  |  |                |  |
| SO-PTC-117-092018-14.5-15.0-(10)  | 9/20/18                         | 1200                        | SO     | 1-4oz                           |                                       | X  |                     |                                 |  |  |  |                |  |
| SO-PTC-112-092018-10.5-11.0   | 9/20/18                         | 1400                        | SO     | 1-8oz                           | X                                     |  | X                   |                                 |  |  |  |                |  |
| SO-PTC-112-092018-10.5-11.0-(10)  | 9/20/18                         | 1400                        | SO     | 1-4oz                           |                                       | X  |                     |                                 |  |  |  |                |  |
| SO-PTC-112-092018-17.0-18.0   | 9/20/18                         | 1410                        | SO     | 1-8oz                           | X                                     |  | X                   |                                 |  |  |  |                |  |
| SO-PTC-112-092018-17.0-18.0-(10)  | 9/20/18                         | 1410                        | SO     | 1-4oz                           |                                       | X  |                     |                                 |  |  |  |                |  |
| SO-PTC-104-092018-13.4-13.9   | 9/20/18                         | 1530                        | SO     | 1-8oz                           | X                                     |  | X                   |                                 |  |  |  |                |  |
| SO-PTC-104-092018-13.4-13.9-(10)  | 9/20/18                         | 1530                        | SO     | 1-4oz                           |                                       | X  |                     |                                 |  |  |  |                |  |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format<br>Bill to Port of Tacoma<br>PO#79227 | Relinquished by:<br>(Signature) | Received by:<br>(Signature) |        | Relinquished by:<br>(Signature) |                                       | Received by:<br>(Signature)                                      |                     |                                 |  |  |  |                |  |
|   | Printed Name:                   | Printed Name:               |        | Printed Name:                   |                                       | Printed Name:  |                     |                                 |  |  |  |                |  |
|   | Company:                        | Company:                    |        | Company:                        |                                       | Company:   |                     |                                 |  |  |  |                |  |
|   | Date & Time:                    | Date & Time:                |        | Date & Time:                    |                                       | Date & Time:   |                     |                                 |  |  |  |                |  |

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# Chain of Custody Record & Laboratory Analysis Request



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 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|   |   |                               |
|---|---|-------------------------------|
| ARI Assigned Number:<br><b>18-10318</b>                       | Turn-around Requested:<br><b>Normal</b>                   | Date:<br><b>9/20/18</b>       |
| ARI Client Company:<br><b>Pioneer Technologies</b>            | Phone:<br><b>360-570-1700</b>                             | Page:<br><b>5</b> of <b>5</b> |
| Client Contact:<br><b>Troy Bussey (busseyt@uspioneer.com)</b> | Client Project Name:<br><b>Arkema FS DG Inv</b>           | No. of Coolers:<br><b>5</b>   |
| Client Project #:<br><b>79227</b>                             | Samplers:<br><b>A. CERRUTI<br/>DG Cooper 206-660-3466</b> | Cooler Temps:                 |

| Sample ID   | Date                            | Time                        | Matrix | No. Containers                  | Analysis Requested                    |   |                     |                                 |  |  |  | Notes/Comments |  |
|---|---------------------------------|-----------------------------|--------|---------------------------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|----------------|--|
|   |                                 |                             |        |                                 | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |                |  |
| SO-PTC-104-092018-14.2-14.7   | 9/20/18                         | 1600                        | SO     | 1-8oz                           | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-104-092018-14.2-14.7-(10)  | 9/20/18                         | 1600                        | SO     | 1-4oz                           |                                       | X   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
|   |                                 |                             |        |                                 |                                       |   |                     |                                 |  |  |  |                |  |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature) | Received by:<br>(Signature) |        | Relinquished by:<br>(Signature) | Received by:<br>(Signature)           |   |                     |                                 |  |  |  |                |  |
|   | Printed Name:                   | Printed Name:               |        | Printed Name:                   | Printed Name:                         |   |                     |                                 |  |  |  |                |  |
|   | Company:                        | Company:                    |        | Company:                        | Company:                              |   |                     |                                 |  |  |  |                |  |
|   | Date & Time:                    | Date & Time:                |        | Date & Time:                    | Date & Time:                          |   |                     |                                 |  |  |  |                |  |

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Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-130-091918-9.5-10.0       | 18I0318-01    | Solid  | 19-Sep-2018 09:20 | 20-Sep-2018 17:30 |
| SO-PTC-130-091918-9.5-10.0-(10)  | 18I0318-02    | Solid  | 19-Sep-2018 09:20 | 20-Sep-2018 17:30 |
| SO-PTC-130-091918-11.0-11.5-(10) | 18I0318-03    | Solid  | 19-Sep-2018 09:40 | 20-Sep-2018 17:30 |
| SO-PTC-130-091918-11.0-11.5      | 18I0318-04    | Solid  | 19-Sep-2018 09:40 | 20-Sep-2018 17:30 |
| SO-PTC-119-091918-6.0-6.5-(10)   | 18I0318-05    | Solid  | 19-Sep-2018 10:45 | 20-Sep-2018 17:30 |
| SO-PTC-119-091918-6.0-6.5        | 18I0318-06    | Solid  | 19-Sep-2018 10:45 | 20-Sep-2018 17:30 |
| SO-PTC-119-091918-11.5-12.0-(10) | 18I0318-07    | Solid  | 19-Sep-2018 11:00 | 20-Sep-2018 17:30 |
| SO-PTC-119-091918-11.5-12.0      | 18I0318-08    | Solid  | 19-Sep-2018 11:00 | 20-Sep-2018 17:30 |
| SO-PTC-128-091918-6.0-6.5-(10)   | 18I0318-09    | Solid  | 19-Sep-2018 12:00 | 20-Sep-2018 17:30 |
| SO-PTC-128-091918-6.0-6.5        | 18I0318-10    | Solid  | 19-Sep-2018 12:00 | 20-Sep-2018 17:30 |
| SO-PTC-128-091918-7.5-8.0-(10)   | 18I0318-11    | Solid  | 19-Sep-2018 12:15 | 20-Sep-2018 17:30 |
| SO-PTC-128-091918-7.5-8.0        | 18I0318-12    | Solid  | 19-Sep-2018 12:15 | 20-Sep-2018 17:30 |
| SO-PTC-116-091918-8.5-9.0-(10)   | 18I0318-13    | Solid  | 19-Sep-2018 14:00 | 20-Sep-2018 17:30 |
| SO-PTC-116-091918-8.5-9.0        | 18I0318-14    | Solid  | 19-Sep-2018 14:00 | 20-Sep-2018 17:30 |
| SO-PTC-116-091918-13.1-13.6-(10) | 18I0318-15    | Solid  | 19-Sep-2018 14:30 | 20-Sep-2018 17:30 |
| SO-PTC-116-091918-13.1-13.6      | 18I0318-16    | Solid  | 19-Sep-2018 14:30 | 20-Sep-2018 17:30 |
| SO-PTC-115-091918-7.5-8.0-(10)   | 18I0318-17    | Solid  | 19-Sep-2018 15:15 | 20-Sep-2018 17:30 |
| SO-PTC-115-091918-7.5-8.0        | 18I0318-18    | Solid  | 19-Sep-2018 15:15 | 20-Sep-2018 17:30 |
| SO-PTC-115-091918-14.5-15.0-(10) | 18I0318-19    | Solid  | 19-Sep-2018 15:30 | 20-Sep-2018 17:30 |
| SO-PTC-115-091918-14.5-15.0      | 18I0318-20    | Solid  | 19-Sep-2018 15:30 | 20-Sep-2018 17:30 |
| SO-PTC-114-092018-7.0-7.5        | 18I0318-21    | Solid  | 20-Sep-2018 09:15 | 20-Sep-2018 17:30 |
| SO-PTC-114-092018-7.0-7.5-(10)   | 18I0318-22    | Solid  | 20-Sep-2018 09:15 | 20-Sep-2018 17:30 |
| SO-PTC-114-092018-13.3-13.8      | 18I0318-23    | Solid  | 20-Sep-2018 09:20 | 20-Sep-2018 17:30 |
| SO-PTC-114-092018-13.3-13.8-(10) | 18I0318-24    | Solid  | 20-Sep-2018 09:20 | 20-Sep-2018 17:30 |
| SO-PTC-118-092018-8.0-8.5        | 18I0318-25    | Solid  | 20-Sep-2018 10:45 | 20-Sep-2018 17:30 |
| SO-PTC-118-092018-8.0-8.5-(10)   | 18I0318-26    | Solid  | 20-Sep-2018 10:45 | 20-Sep-2018 17:30 |
| SO-PTC-118-092018-10.5-11.0      | 18I0318-27    | Solid  | 20-Sep-2018 11:00 | 20-Sep-2018 17:30 |
| SO-PTC-118-092018-10.5-11.0-(10) | 18I0318-28    | Solid  | 20-Sep-2018 11:00 | 20-Sep-2018 17:30 |
| SO-PTC-117-092018-6.4-6.9        | 18I0318-29    | Solid  | 20-Sep-2018 11:45 | 20-Sep-2018 17:30 |
| SO-PTC-117-092018-6.4-6.9-(10)   | 18I0318-30    | Solid  | 20-Sep-2018 11:45 | 20-Sep-2018 17:30 |
| SO-PTC-117-092018-(01)           | 18I0318-31    | Solid  | 20-Sep-2018 11:50 | 20-Sep-2018 17:30 |
| SO-PTC-117-092018-(11)           | 18I0318-32    | Solid  | 20-Sep-2018 11:50 | 20-Sep-2018 17:30 |
| SO-PTC-117-092018-14.5-15.0      | 18I0318-33    | Solid  | 20-Sep-2018 12:00 | 20-Sep-2018 17:30 |
| SO-PTC-117-092018-14.5-15.0-(10) | 18I0318-34    | Solid  | 20-Sep-2018 12:00 | 20-Sep-2018 17:30 |
| SO-PTC-112-092018-10.5-11.0      | 18I0318-35    | Solid  | 20-Sep-2018 14:00 | 20-Sep-2018 17:30 |
| SO-PTC-112-092018-10.5-11.0-(10) | 18I0318-36    | Solid  | 20-Sep-2018 14:00 | 20-Sep-2018 17:30 |
| SO-PTC-112-092018-17.0-18.0      | 18I0318-37    | Solid  | 20-Sep-2018 14:10 | 20-Sep-2018 17:30 |
| SO-PTC-112-092018-17.0-18.0-(10) | 18I0318-38    | Solid  | 20-Sep-2018 14:10 | 20-Sep-2018 17:30 |
| SO-PTC-104-092018-13.4-13.9      | 18I0318-39    | Solid  | 20-Sep-2018 15:30 | 20-Sep-2018 17:30 |



|  |            |  |                   |                                       |
|--|------------|--|-------------------|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 |            | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. |                   | <b>Reported:</b><br>09-Oct-2018 11:47 |
| SO-PTC-104-092018-13.4-13.9-(10)   | 18I0318-40 | Solid  | 20-Sep-2018 15:30 | 20-Sep-2018 17:30                     |
| SO-PTC-104-092018-14.2-14.7  | 18I0318-41 | Solid  | 20-Sep-2018 16:00 | 20-Sep-2018 17:30                     |
| SO-PTC-104-092018-14.2-14.7-(10)   | 18I0318-42 | Solid  | 20-Sep-2018 16:00 | 20-Sep-2018 17:30                     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 20, 2018 under ARI work order 18I0318. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total Arsenic - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank BGI0755 has Arsenic detected below the reporting limit, but above the method detection limit. The Arsenic has been flagged with a "J" qualifier on the method blank. There were no Arsenic detections above the reporting limits in the method blanks. No further corrective action was taken.

The LCS percent recoveries were within control limits.

### TCLP Metals

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank BGI0168 has Barium detected above the reporting limit. Associated detected results and QC have been flagged with "B" qualifiers. This is due to the filter used during prep. The method blanks have various metals detected below the reporting limits, but above the method detection limits. These metals have been flagged with "J" qualifiers on the method blanks. There were no other target metals detected above the reporting limits in the method blanks. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-115-091918-7.5-8.0-(10). The duplicate has a Cadmium concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to +/- the reporting limit instead of 20% of the RPD. The Cadmium has been flagged with an "L" qualifier on the duplicate. The results are advisory. All other matrix spike percent recoveries and duplicate RPD were within QC limits. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-114-092018-7.0-7.5-(10). The matrix spike percent recoveries and duplicate RPD were within QC limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-118-092018-10.5-11.0-(10). The duplicate has Barium and Selenium concentrations  $\leq 5$  times the reporting limits, and the replicate control limits default to +/- the reporting limits instead of 20% of the RPD. These metals have been flagged with "L" qualifiers on the duplicate. The results are advisory. All other matrix spike percent recoveries and duplicate RPD were within QC limits. No further corrective action was taken.

### TCLP Hg



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blanks were clean at the reporting limits.

Matrix spikes and duplicates were prepared in conjunction with samples SO-PTC-115-091918-14.5-15.0-(10), SO-PTC-114-092018-13.3-13.8-(10) and SO-PTC-117-092018-6.4-6.9-(10). The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **pH - EPA Method 9045D**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample SO-PTC-130-091918-9.5-10.0. The duplicate RPD was within QC limits.



# Cooler Receipt Form

ARI Client: DDP Pioneer Tech.  
COC No(s): \_\_\_\_\_ NA  
Assigned ARI Job No: 1870318

Project Name: Arkema FS DG In-  
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO  
 Were custody papers included with the cooler? YES NO  
 Were custody papers properly filled out (ink, signed, etc.) YES NO  
 Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
 Time: 1730 19 \_\_\_\_\_  
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005206  
 Cooler Accepted by: JES Date: 9/10/18 Time: 1730

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

Was a temperature blank included in the cooler? YES NO  
 What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? NA YES NO  
 Were all bottles sealed in individual plastic bags? YES NO  
 Did all bottles arrive in good condition (unbroken)? YES NO  
 Were all bottle labels complete and legible? YES NO  
 Did the number of containers listed on COC match with the number of containers received? YES NO  
 Did all bottle labels and tags agree with custody papers? YES NO  
 Were all bottles used correct for the requested analyses? YES NO  
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO  
 Were all VOC vials free of air bubbles? NA YES NO  
 Was sufficient amount of sample sent in each bottle? YES NO  
 Date VOC Trip Blank was made at ARI: NA \_\_\_\_\_  
 Was Sample Split by ARI: NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: JES Date: 9/21/18 Time: 1400

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_ Date: \_\_\_\_\_

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-130-091918-9.5-10.0**  
**18I0318-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 09:20

Instrument: ICP2 Analyst: TCH

Analyzed: 02-Oct-2018 12:27

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0785

Prepared: 28-Sep-2018

Sample Size: 1.07 g (wet)

Final Volume: 50 mL

Dry Weight: 0.82 g

% Solids: 76.75

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.572           | 6.09            | <b>129</b> | mg/kg |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-130-091918-9.5-10.0**  
**18I0318-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 09:20

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.28 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.34</b> | pH Units |       |



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Olympia WA, 98503

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Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-130-091918-9.5-10.0-(10)**  
**18I0318-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 09:20

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 17:04

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.271</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0225</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0018</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-130-091918-9.5-10.0-(10)**  
**18I0318-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 09:20

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:19

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000008</b> | mg/L  | J     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-130-091918-11.0-11.5-(10)**  
**18I0318-03 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 09:40

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 17:08

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.506</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0328</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0038</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-130-091918-11.0-11.5-(10)**  
**18I0318-03 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 09:40

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:21

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-130-091918-11.0-11.5**  
**18I0318-04 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/19/2018 09:40  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 12:32

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.022 g (wet) Dry Weight: 0.69 g  
Preparation Batch: BGI0785 Final Volume: 50 mL % Solids: 67.42  
Prepared: 28-Sep-2018

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.682           | 7.26            | 263    | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-130-091918-11.0-11.5**  
**18I0318-04 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 09:40

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.11 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.60</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-119-091918-6.0-6.5-(10)**  
**18I0318-05 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 10:45

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 17:12

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>2.02</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0199</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0030</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0400</b> | mg/L  |       |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-119-091918-6.0-6.5-(10)**  
**18I0318-05 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 10:45

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:23

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000107</b> | mg/L  |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-119-091918-6.0-6.5**  
**18I0318-06 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/19/2018 10:45  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 12:36

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.91 g  
Preparation Batch: BGI0785 % Solids: 83.91  
Prepared: 28-Sep-2018 Sample Size: 1.08 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.519           | 5.52            | <b>590</b> | mg/kg |       |





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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-119-091918-6.0-6.5**  
**18I0318-06 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 10:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.07 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.02</b> | pH Units |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-119-091918-11.5-12.0-(10)**  
**18I0318-07 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 11:00

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 17:17

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | 15.2   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | 0.0356 | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | 0.0065 | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND     | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND     | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND     | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-119-091918-11.5-12.0-(10)**  
**18I0318-07 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 11:00

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:26

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-119-091918-11.5-12.0**  
**18I0318-08 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/19/2018 11:00  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 13:04

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.027 g (wet) Dry Weight:0.64 g  
Preparation Batch: BGI0785 Final Volume: 50 mL % Solids: 62.47  
Prepared: 28-Sep-2018

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.733           | 7.79            | <b>2860</b> | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-119-091918-11.5-12.0**  
**18I0318-08 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 11:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.01 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.31</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-128-091918-6.0-6.5-(10)**  
**18I0318-09 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 12:00

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 17:21

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>3.43</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0289</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0045</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-128-091918-6.0-6.5-(10)**  
**18I0318-09 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 12:00

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:28

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-128-091918-6.0-6.5**  
**18I0318-10 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/19/2018 12:00  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 13:09

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.80 g  
Preparation Batch: BGI0785 % Solids: 77.81  
Prepared: 28-Sep-2018 Sample Size: 1.026 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.589           | 6.26            | 55.6   | mg/kg |       |





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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-128-091918-6.0-6.5**  
**18I0318-10 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 12:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.31 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.00</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-128-091918-7.5-8.0-(10)**  
**18I0318-11 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 12:15

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 17:25

Sample Preparation:

Preparation Method: LEN Digestion of EPA 1311 Elutriate

Preparation Batch: BGI0782

Sample Size: 25 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>1.13</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0320</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0033</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-128-091918-7.5-8.0-(10)**  
**18I0318-11 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 12:15

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:30

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-128-091918-7.5-8.0**  
**18I0318-12 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 12:15

Instrument: ICP2 Analyst: TCH

Analyzed: 02-Oct-2018 13:13

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0785

Prepared: 28-Sep-2018

Sample Size: 1.078 g (wet)

Final Volume: 50 mL

Dry Weight: 0.58 g

% Solids: 53.74

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.811           | 8.63            | <b>4060</b> | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-128-091918-7.5-8.0**  
**18I0318-12 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 12:15

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.07 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.30</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-116-091918-8.5-9.0-(10)**  
**18I0318-13 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 14:00

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 17:30

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.240</b>  | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0134</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0028</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-116-091918-8.5-9.0-(10)**  
**18I0318-13 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 14:00

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:33

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-116-091918-8.5-9.0**  
**18I0318-14 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/19/2018 14:00  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 13:17

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.85 g  
Preparation Batch: BGI0785 % Solids: 84.24  
Prepared: 28-Sep-2018 Sample Size: 1.007 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.554           | 5.89            | 77.1   | mg/kg |       |





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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-116-091918-8.5-9.0**  
**18I0318-14 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 14:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.09 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.05</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-116-091918-13.1-13.6-(10)**  
**18I0318-15 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 14:30

Instrument: ICP2 Analyst: TCH

Analyzed: 01-Oct-2018 17:34

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGI0782 Sample Size: 25 mL (wet)  
Prepared: 28-Sep-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | 8.52   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | 0.0215 | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | 0.0033 | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND     | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND     | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND     | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-116-091918-13.1-13.6-(10)**  
**18I0318-15 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 14:30

Instrument: CVAA Analyst: DP

Analyzed: 02-Oct-2018 12:35

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGI0783

Sample Size: 20 mL (wet)

Prepared: 28-Sep-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-116-091918-13.1-13.6**  
**18I0318-16 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/19/2018 14:30  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 16:55

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.75 g  
Preparation Batch: BGI0785 % Solids: 69.67  
Prepared: 28-Sep-2018 Sample Size: 1.07 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 10       | 3.15            | 33.5            | <b>7490</b> | mg/kg | D     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-116-091918-13.1-13.6**  
**18I0318-16 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 14:30

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.06 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>10.4</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-115-091918-7.5-8.0-(10)**  
**18I0318-17 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 15:15

Instrument: ICP2 Analyst: TCH

Analyzed: 04-Oct-2018 11:56

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0129 Sample Size: 25 mL (wet)  
Prepared: 03-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.134</b>  | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0394</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0015</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0033</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-115-091918-7.5-8.0-(10)**  
**18I0318-17 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 15:15

Instrument: CVAA Analyst: DP

Analyzed: 04-Oct-2018 09:31

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0130

Sample Size: 20 mL (wet)

Prepared: 03-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-115-091918-7.5-8.0**  
**18I0318-18 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 15:15

Instrument: ICP2 Analyst: TCH

Analyzed: 02-Oct-2018 13:25

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0785

Prepared: 28-Sep-2018

Sample Size: 1.06 g (wet)

Final Volume: 50 mL

Dry Weight: 0.88 g

% Solids: 83.49

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.531           | 5.65            | 35.5   | mg/kg |       |





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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-115-091918-7.5-8.0**  
**18I0318-18 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 15:15

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.21 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.78</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-115-091918-14.5-15.0-(10)**  
**18I0318-19 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/19/2018 15:30

Instrument: ICP2 Analyst: TCH

Analyzed: 04-Oct-2018 11:47

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0129 Sample Size: 25 mL (wet)  
Prepared: 03-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>1.07</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0260</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0030</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0076</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-115-091918-14.5-15.0-(10)**  
**18I0318-19 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/19/2018 15:30

Instrument: CVAA Analyst: DP

Analyzed: 04-Oct-2018 09:33

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0130

Sample Size: 20 mL (wet)

Prepared: 03-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000038</b> | mg/L  | J     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-115-091918-14.5-15.0**  
**18I0318-20 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/19/2018 15:30  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 13:29

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.089 g (wet)  
Preparation Batch: BGI0785 Final Volume: 50 mL  
Prepared: 28-Sep-2018 Dry Weight: 0.79 g  
% Solids: 72.87

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.592           | 6.30            | <b>156</b> | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-115-091918-14.5-15.0**  
**18I0318-20 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2018 15:30

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.01 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>11.1</b> | pH Units |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-114-092018-7.0-7.5**  
**18I0318-21 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/20/2018 09:15  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 13:33

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.057 g (wet)  
Preparation Batch: BGI0785 Final Volume: 50 mL  
Prepared: 28-Sep-2018 Dry Weight: 0.86 g  
% Solids: 81.14

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.548           | 5.83            | <b>121</b> | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-114-092018-7.0-7.5**  
**18I0318-21 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 09:15

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.18 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>10.4</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-114-092018-7.0-7.5-(10)**  
**18I0318-22 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 09:15

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 11:17

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0168 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.187</b>  | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | ND            | mg/L  | B, U  |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0027</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | <b>0.0900</b> | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-114-092018-7.0-7.5-(10)**  
**18I0318-22 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 09:15

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 10:26

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0170

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-114-092018-13.3-13.8**  
**18I0318-23 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/20/2018 09:20  
Instrument: ICP2 Analyst: TCH Analyzed: 02-Oct-2018 13:37

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.048 g (wet)  
Preparation Batch: BGI0785 Final Volume: 50 mL  
Prepared: 28-Sep-2018 Dry Weight: 0.66 g  
% Solids: 63.07

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.711           | 7.56            | <b>2670</b> | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-114-092018-13.3-13.8**  
**18I0318-23 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 09:20

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.21 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>9.53</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-114-092018-13.3-13.8-(10)**  
**18I0318-24 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 09:20

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 11:04

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0168 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>8.43</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.115</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0072</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0604</b> | mg/L  |       |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | <b>0.113</b>  | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-114-092018-13.3-13.8-(10)**  
**18I0318-24 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 09:20

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 10:29

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0170

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-118-092018-8.0-8.5**  
**18I0318-25 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 10:45

Instrument: ICP2 Analyst: TCH

Analyzed: 02-Oct-2018 13:41

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGI0785

Prepared: 28-Sep-2018

Sample Size: 1.019 g (wet)

Final Volume: 50 mL

Dry Weight: 0.84 g

% Solids: 82.89

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.556           | 5.92            | <b>70.9</b> | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-118-092018-8.0-8.5**  
**18I0318-25 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 10:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.23 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>10.1</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-118-092018-8.0-8.5-(10)**  
**18I0318-26 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 10:45

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 11:08

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0168 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.434</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0299</b> | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0015</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | <b>0.0574</b> | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-118-092018-8.0-8.5-(10)**  
**18I0318-26 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 10:45

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 10:36

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0170

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-118-092018-10.5-11.0**  
**18I0318-27 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 11:00

Instrument: ICP2 Analyst: TCH

Analyzed: 03-Oct-2018 13:42

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0021

Prepared: 01-Oct-2018

Sample Size: 1.008 g (wet)

Final Volume: 50 mL

Dry Weight: 0.53 g

% Solids: 52.11

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 2.24            | 23.8            | <b>6200</b> | mg/kg | D     |



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Project Number: 79227  
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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-118-092018-10.5-11.0**  
**18I0318-27 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 11:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.99</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-118-092018-10.5-11.0-(10)**  
**18I0318-28 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 11:00

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 12:08

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0169 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | 1.74   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | 0.0126 | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | 0.0020 | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | 0.0058 | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND     | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | 0.122  | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-118-092018-10.5-11.0-(10)**  
**18I0318-28 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 11:00

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 09:32

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0171

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-6.4-6.9**  
**18I0318-29 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 11:45

Instrument: ICP2 Analyst: TCH

Analyzed: 03-Oct-2018 11:45

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0021

Prepared: 01-Oct-2018

Sample Size: 1.059 g (wet)

Final Volume: 50 mL

Dry Weight: 0.85 g

% Solids: 80.39

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.552           | 5.87            | <b>189</b> | mg/kg |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-6.4-6.9**  
**18I0318-29 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 11:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.78</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-117-092018-6.4-6.9-(10)**  
**18I0318-30 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 11:45

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 11:38

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0169 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.0869</b> | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0106</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0008</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0140</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | <b>0.0766</b> | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-6.4-6.9-(10)**  
**18I0318-30 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 11:45

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 09:34

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0171

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-(01)**  
**18I0318-31 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/20/2018 11:50  
Instrument: ICP2 Analyst: TCH Analyzed: 03-Oct-2018 11:49

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.84 g  
Preparation Batch: BGJ0021 % Solids: 78.85  
Prepared: 01-Oct-2018 Sample Size: 1.062 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.561           | 5.97            | <b>406</b> | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-(01)**  
**18I0318-31 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 11:50

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.32 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.92</b> | pH Units |       |



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Reported:  
09-Oct-2018 11:47

**SO-PTC-117-092018-(11)**  
**18I0318-32 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 11:50

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 11:43

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0169 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.164</b>  | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0138</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0034</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0125</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | <b>0.0596</b> | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-(11)**  
**18I0318-32 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 11:50

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 09:41

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0171

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-14.5-15.0**  
**18I0318-33 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/20/2018 12:00  
Instrument: ICP2 Analyst: TCH Analyzed: 03-Oct-2018 13:46

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.61 g  
Preparation Batch: BGJ0021 % Solids: 57.20  
Prepared: 01-Oct-2018 Sample Size: 1.075 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.91            | 20.3            | <b>4580</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-14.5-15.0**  
**18I0318-33 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 12:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.19 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.69</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
09-Oct-2018 11:47

**SO-PTC-117-092018-14.5-15.0-(10)**  
**18I0318-34 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 12:00

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 11:47

Sample Preparation:

Preparation Method: LEN Digestion of EPA 1311 Elutriate

Preparation Batch: BGJ0169

Sample Size: 25 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | 95.2   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | 0.0180 | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | 0.0527 | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | 0.0257 | mg/L  |       |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND     | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | 0.0846 | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND     | mg/L  | U     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-117-092018-14.5-15.0-(10)**  
**18I0318-34 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 12:00

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 09:43

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0171

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-112-092018-10.5-11.0**  
**18I0318-35 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/20/2018 14:00  
Instrument: ICP2 Analyst: TCH Analyzed: 03-Oct-2018 11:57

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.84 g  
Preparation Batch: BGJ0021 % Solids: 82.18  
Prepared: 01-Oct-2018 Sample Size: 1.017 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.562           | 5.98            | 723    | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-112-092018-10.5-11.0**  
**18I0318-35 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 14:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.06 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.90</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-112-092018-10.5-11.0-(10)**  
**18I0318-36 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 14:00

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 11:51

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0169 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>1.70</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0091</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0044</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | <b>0.0576</b> | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-112-092018-10.5-11.0-(10)**  
**18I0318-36 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 14:00

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 09:46

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0171

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-112-092018-17.0-18.0**  
**18I0318-37 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/20/2018 14:10  
Instrument: ICP2 Analyst: TCH Analyzed: 03-Oct-2018 12:01

Sample Preparation: Preparation Method: SWC EPA 3050B Sample Size: 1.019 g (wet) Dry Weight: 0.54 g  
Preparation Batch: BGJ0021 Final Volume: 50 mL % Solids: 53.37  
Prepared: 01-Oct-2018

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.864           | 9.19            | <b>2530</b> | mg/kg |       |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-112-092018-17.0-18.0**  
**18I0318-37 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 14:10

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.05 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.96</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-112-092018-17.0-18.0-(10)**  
**18I0318-38 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 14:10

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 11:55

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0169 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>35.0</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0283</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0281</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0048</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | <b>0.0855</b> | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-112-092018-17.0-18.0-(10)**  
**18I0318-38 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 14:10

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 09:48

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0171

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-104-092018-13.4-13.9**  
**18I0318-39 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/20/2018 15:30  
Instrument: ICP2 Analyst: TCH Analyzed: 03-Oct-2018 12:05

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.85 g  
Preparation Batch: BGJ0021 % Solids: 82.37  
Prepared: 01-Oct-2018 Sample Size: 1.028 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.555           | 5.90            | <b>902</b> | mg/kg |       |



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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-104-092018-13.4-13.9**  
**18I0318-39 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 15:30

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0696

Prepared: 26-Sep-2018

Sample Size: 20.15 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.58</b> | pH Units |       |



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Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-104-092018-13.4-13.9-(10)**  
**18I0318-40 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 15:30

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 12:00

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0169 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | 2.72   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | 0.0447 | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | 0.0035 | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | 0.0031 | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | 0.0151 | mg/L  | J     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | 0.0776 | mg/L  | J     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND     | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-104-092018-13.4-13.9-(10)**  
**18I0318-40 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 15:30

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 10:19

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0171

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000016</b> | mg/L  | J     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-104-092018-14.2-14.7**  
**18I0318-41 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/20/2018 16:00  
Instrument: ICP2 Analyst: TCH Analyzed: 03-Oct-2018 13:50

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.50 g  
Preparation Batch: BGJ0021 Final Volume: 50 mL  
Prepared: 01-Oct-2018 % Solids: 49.34

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 2.33            | 24.8            | <b>8260</b> | mg/kg | D     |



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**Reported:**  
09-Oct-2018 11:47

**SO-PTC-104-092018-14.2-14.7**  
**18I0318-41 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2018 16:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.07 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.70</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**SO-PTC-104-092018-14.2-14.7-(10)**  
**18I0318-42 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/20/2018 16:00

Instrument: ICP2 Analyst: TCH

Analyzed: 05-Oct-2018 13:10

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0169 Sample Size: 25 mL (wet)  
Prepared: 04-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 10       | 0.0280          | 0.500           | <b>198</b>    | mg/L  | D     |
| Barium   | 7440-39-3  | 10       | 0.0149          | 0.0300          | <b>0.0263</b> | mg/L  | J, D  |
| Cadmium  | 7440-43-9  | 10       | 0.0012          | 0.0200          | <b>0.0951</b> | mg/L  | D     |
| Chromium | 7440-47-3  | 10       | 0.0047          | 0.0500          | <b>0.0304</b> | mg/L  | J, D  |
| Lead     | 7439-92-1  | 10       | 0.0130          | 0.200           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 10       | 0.0816          | 0.500           | <b>0.0860</b> | mg/L  | J, D  |
| Silver   | 7440-22-4  | 10       | 0.0044          | 0.0300          | ND            | mg/L  | U     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**SO-PTC-104-092018-14.2-14.7-(10)**  
**18I0318-42 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/20/2018 16:00

Instrument: CVAA Analyst: DP

Analyzed: 05-Oct-2018 10:22

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0171

Sample Size: 20 mL (wet)

Prepared: 04-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000050</b> | mg/L  | J     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**Metals and Metallic Compounds - Quality Control**

**Batch BGI0785 - SWC EPA 3050B**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGI0785-BLK1)</b> |        |                 |                 |       |             | Prepared: 28-Sep-2018 Analyzed: 02-Oct-2018 11:34 |      |             |     |           |       |
| Arsenic                     | 0.496  | 0.470           | 5.00            | mg/kg |             |   |      |             |     |           | J     |
| <b>LCS (BGI0785-BS1)</b>    |        |                 |                 |       |             | Prepared: 28-Sep-2018 Analyzed: 02-Oct-2018 12:02 |      |             |     |           |       |
| Arsenic                     | 194    | 0.470           | 5.00            | mg/kg | 200         |   | 96.8 | 80-120      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**Metals and Metallic Compounds - Quality Control**

**Batch BGJ0021 - SWC EPA 3050B**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0021-BLK1)</b> |        |                 |                 |       |             | Prepared: 01-Oct-2018 Analyzed: 02-Oct-2018 16:34 |      |             |     |           |       |
| Arsenic                     | ND     | 0.470           | 5.00            | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BGJ0021-BS1)</b>    |        |                 |                 |       |             | Prepared: 01-Oct-2018 Analyzed: 02-Oct-2018 17:09 |      |             |     |           |       |
| Arsenic                     | 195    | 0.470           | 5.00            | mg/kg | 200         |   | 97.6 | 80-120      |     |           |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGI0782 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGI0782-BLK1)</b> |        |                 |                 |       |             | Prepared: 28-Sep-2018 Analyzed: 01-Oct-2018 15:20 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0140          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Barium                      | ND     | 0.0075          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |
| Cadmium                     | 0.0029 | 0.0006          | 0.0100          | mg/L  |             |   |      |             |     |           | J     |
| Chromium                    | ND     | 0.0024          | 0.0250          | mg/L  |             |   |      |             |     |           | U     |
| Lead                        | ND     | 0.0065          | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| Selenium                    | ND     | 0.0408          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Silver                      | ND     | 0.0022          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>09-Oct-2018 11:47 |
|--|--|---------------------------------------|

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGI0783 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGI0783-BLK1)</b> |        |                 |                 |       |             | Prepared: 28-Sep-2018 Analyzed: 02-Oct-2018 11:47 |      |             |     |           |       |
| Mercury                     | ND     | 0.000007        | 0.000100        | mg/L  |             |   |      |             |     |           | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0129 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|--------------------|-------|-------------|---|------|-------------|-------|-----------|-------|
| <b>Blank (BGJ0129-BLK1)</b>       |        |                 |                    |       |             |   |      |             |       |           |       |
|                                   |        |                 |                    |       |             | Prepared: 03-Oct-2018 Analyzed: 04-Oct-2018 11:22 |      |             |       |           |       |
| Arsenic                           | ND     | 0.0140          | 0.250              | mg/L  |             |   |      |             |       |           | U     |
| Barium                            | 0.0141 | 0.0075          | 0.0150             | mg/L  |             |   |      |             |       |           | J     |
| Cadmium                           | 0.0007 | 0.0006          | 0.0100             | mg/L  |             |   |      |             |       |           | J     |
| Chromium                          | ND     | 0.0024          | 0.0250             | mg/L  |             |   |      |             |       |           | U     |
| Lead                              | ND     | 0.0065          | 0.100              | mg/L  |             |   |      |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250              | mg/L  |             |   |      |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150             | mg/L  |             |   |      |             |       |           | U     |
| <b>Duplicate (BGJ0129-DUP1)</b>   |        |                 |                    |       |             |   |      |             |       |           |       |
|                                   |        |                 | Source: 18I0318-17 |       |             | Prepared: 03-Oct-2018 Analyzed: 04-Oct-2018 11:52 |      |             |       |           |       |
| Arsenic                           | 0.111  | 0.0140          | 0.250              | mg/L  |             | 0.134   |      |             | 18.80 | 20        | J     |
| Barium                            | 0.0393 | 0.0075          | 0.0150             | mg/L  |             | 0.0394  |      |             | 0.17  | 20        |       |
| Cadmium                           | 0.0018 | 0.0006          | 0.0100             | mg/L  |             | 0.0015  |      |             | 20.80 | 20        | L, J  |
| Chromium                          | ND     | 0.0024          | 0.0250             | mg/L  |             | 0.0033  |      |             |       |           | U     |
| Lead                              | ND     | 0.0065          | 0.100              | mg/L  |             | ND  |      |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250              | mg/L  |             | ND  |      |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150             | mg/L  |             | ND  |      |             |       |           | U     |
| <b>Matrix Spike (BGJ0129-MS1)</b> |        |                 |                    |       |             |   |      |             |       |           |       |
|                                   |        |                 | Source: 18I0318-17 |       |             | Prepared: 03-Oct-2018 Analyzed: 04-Oct-2018 12:00 |      |             |       |           |       |
| Arsenic                           | 4.52   | 0.0140          | 0.250              | mg/L  | 4.00        | 0.134   | 110  | 75-125      |       |           |       |
| Barium                            | 4.19   | 0.0075          | 0.0150             | mg/L  | 4.00        | 0.0394  | 104  | 75-125      |       |           |       |
| Cadmium                           | 1.07   | 0.0006          | 0.0100             | mg/L  | 1.00        | 0.0015  | 107  | 75-125      |       |           |       |
| Chromium                          | 1.07   | 0.0024          | 0.0250             | mg/L  | 1.00        | 0.0033  | 107  | 75-125      |       |           |       |
| Lead                              | 4.34   | 0.0065          | 0.100              | mg/L  | 4.00        | ND  | 108  | 75-125      |       |           |       |
| Selenium                          | 4.65   | 0.0408          | 0.250              | mg/L  | 4.00        | ND  | 116  | 75-125      |       |           |       |
| Silver                            | 1.10   | 0.0022          | 0.0150             | mg/L  | 1.00        | ND  | 110  | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0130 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte                 | Result   | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|----------|-----------------|-----------------|-------|-------------|--|------|-------------|-------|-----------|-------|
| <b>Blank (BGJ0130-BLK1)</b>       |          |                 |                 |       |             | Prepared: 03-Oct-2018 Analyzed: 04-Oct-2018 09:29                    |      |             |       |           |       |
| Mercury                           | ND       | 0.000007        | 0.000100        | mg/L  |             |  |      |             |       |           | U     |
| <b>Duplicate (BGJ0130-DUP1)</b>   |          |                 |                 |       |             | Source: 18I0318-19 Prepared: 03-Oct-2018 Analyzed: 04-Oct-2018 09:36 |      |             |       |           |       |
| Mercury                           | 0.000033 | 0.000007        | 0.000100        | mg/L  |             | 0.000038   |      |             | 14.60 | 20        | J     |
| <b>Matrix Spike (BGJ0130-MS1)</b> |          |                 |                 |       |             | Source: 18I0318-19 Prepared: 03-Oct-2018 Analyzed: 04-Oct-2018 09:38 |      |             |       |           |       |
| Mercury                           | 0.000981 | 0.000007        | 0.000100        | mg/L  | 0.00100     | 0.000038   | 94.3 | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0168 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BGJ0168-BLK1)</b>       |        |                 |                 |       |             |  |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 10:43                    |      |             |      |           |       |
| Arsenic                           | ND     | 0.0140          | 0.250           | mg/L  |             |  |      |             |      |           | U     |
| Barium                            | 0.0225 | 0.0075          | 0.0150          | mg/L  |             |  |      |             |      |           | B     |
| Cadmium                           | 0.0014 | 0.0006          | 0.0100          | mg/L  |             |  |      |             |      |           | J     |
| Chromium                          | ND     | 0.0024          | 0.0250          | mg/L  |             |  |      |             |      |           | U     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             |  |      |             |      |           | U     |
| Selenium                          | 0.0564 | 0.0408          | 0.250           | mg/L  |             |  |      |             |      |           | J     |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             |  |      |             |      |           | U     |
| <b>Duplicate (BGJ0168-DUP1)</b>   |        |                 |                 |       |             |  |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Source: 18I0318-22 Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 11:13 |      |             |      |           |       |
| Arsenic                           | 0.187  | 0.0140          | 0.250           | mg/L  |             | 0.187  |      |             | 0.04 | 20        | J     |
| Barium                            | 0.0089 | 0.0075          | 0.0150          | mg/L  |             | ND   |      |             |      |           | J, B  |
| Cadmium                           | 0.0028 | 0.0006          | 0.0100          | mg/L  |             | 0.0027   |      |             | 4.61 | 20        | J     |
| Chromium                          | ND     | 0.0024          | 0.0250          | mg/L  |             | ND   |      |             |      |           | U     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             | ND   |      |             |      |           | U     |
| Selenium                          | 0.0921 | 0.0408          | 0.250           | mg/L  |             | 0.0900   |      |             | 2.33 | 20        | J     |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             | ND   |      |             |      |           | U     |
| <b>Matrix Spike (BGJ0168-MS1)</b> |        |                 |                 |       |             |  |      |             |      |           |       |
|                                   |        |                 |                 |       |             | Source: 18I0318-22 Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 11:21 |      |             |      |           |       |
| Arsenic                           | 4.47   | 0.0140          | 0.250           | mg/L  | 4.00        | 0.187  | 107  | 75-125      |      |           |       |
| Barium                            | 4.20   | 0.0075          | 0.0150          | mg/L  | 4.00        | ND   | 105  | 75-125      |      |           | B     |
| Cadmium                           | 1.06   | 0.0006          | 0.0100          | mg/L  | 1.00        | 0.0027   | 106  | 75-125      |      |           |       |
| Chromium                          | 1.08   | 0.0024          | 0.0250          | mg/L  | 1.00        | ND   | 108  | 75-125      |      |           |       |
| Lead                              | 4.09   | 0.0065          | 0.100           | mg/L  | 4.00        | ND   | 102  | 75-125      |      |           |       |
| Selenium                          | 4.48   | 0.0408          | 0.250           | mg/L  | 4.00        | 0.0900   | 110  | 75-125      |      |           |       |
| Silver                            | 1.07   | 0.0022          | 0.0150          | mg/L  | 1.00        | ND   | 107  | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0169 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|------|-------------|-------|-----------|-------|
| <b>Blank (BGJ0169-BLK1)</b>       |        |                 |                 |       |             |  |      |             |       |           |       |
|                                   |        |                 |                 |       |             | Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 11:34                    |      |             |       |           |       |
| Arsenic                           | 0.0216 | 0.0140          | 0.250           | mg/L  |             |  |      |             |       |           | J     |
| Barium                            | ND     | 0.0075          | 0.0150          | mg/L  |             |  |      |             |       |           | U     |
| Cadmium                           | 0.0007 | 0.0006          | 0.0100          | mg/L  |             |  |      |             |       |           | J     |
| Chromium                          | ND     | 0.0024          | 0.0250          | mg/L  |             |  |      |             |       |           | U     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             |  |      |             |       |           | U     |
| Selenium                          | 0.0654 | 0.0408          | 0.250           | mg/L  |             |  |      |             |       |           | J     |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             |  |      |             |       |           | U     |
| <b>Duplicate (BGJ0169-DUP1)</b>   |        |                 |                 |       |             |  |      |             |       |           |       |
|                                   |        |                 |                 |       |             | Source: 18I0318-28 Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 12:04 |      |             |       |           |       |
| Arsenic                           | 1.75   | 0.0140          | 0.250           | mg/L  |             | 1.74   |      |             | 0.61  | 20        |       |
| Barium                            | 0.0150 | 0.0075          | 0.0150          | mg/L  |             | 0.0126   |      |             | 17.40 | 20        | J     |
| Cadmium                           | 0.0028 | 0.0006          | 0.0100          | mg/L  |             | 0.0020   |      |             | 34.40 | 20        | L, J  |
| Chromium                          | ND     | 0.0024          | 0.0250          | mg/L  |             | 0.0058   |      |             |       |           | U     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             | ND   |      |             |       |           | U     |
| Selenium                          | 0.0571 | 0.0408          | 0.250           | mg/L  |             | 0.122  |      |             | 72.70 | 20        | L, J  |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             | ND   |      |             |       |           | U     |
| <b>Matrix Spike (BGJ0169-MS1)</b> |        |                 |                 |       |             |  |      |             |       |           |       |
|                                   |        |                 |                 |       |             | Source: 18I0318-28 Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 12:12 |      |             |       |           |       |
| Arsenic                           | 6.23   | 0.0140          | 0.250           | mg/L  | 4.00        | 1.74   | 112  | 75-125      |       |           |       |
| Barium                            | 4.32   | 0.0075          | 0.0150          | mg/L  | 4.00        | 0.0126   | 108  | 75-125      |       |           |       |
| Cadmium                           | 1.10   | 0.0006          | 0.0100          | mg/L  | 1.00        | 0.0020   | 110  | 75-125      |       |           |       |
| Chromium                          | 1.12   | 0.0024          | 0.0250          | mg/L  | 1.00        | 0.0058   | 111  | 75-125      |       |           |       |
| Lead                              | 4.25   | 0.0065          | 0.100           | mg/L  | 4.00        | ND   | 106  | 75-125      |       |           |       |
| Selenium                          | 4.64   | 0.0408          | 0.250           | mg/L  | 4.00        | 0.122  | 113  | 75-125      |       |           |       |
| Silver                            | 1.11   | 0.0022          | 0.0150          | mg/L  | 1.00        | ND   | 111  | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0170 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte                 | Result  | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|-----------------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0170-BLK1)</b>       |         |                 |                 |       |             | Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 10:24                    |      |             |     |           |       |
| Mercury                           | ND      | 0.000007        | 0.000100        | mg/L  |             |  |      |             |     |           | U     |
| <b>Duplicate (BGJ0170-DUP1)</b>   |         |                 |                 |       |             | Source: 18I0318-24 Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 10:31 |      |             |     |           |       |
| Mercury                           | ND      | 0.000007        | 0.000100        | mg/L  |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BGJ0170-MS1)</b> |         |                 |                 |       |             | Source: 18I0318-24 Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 10:33 |      |             |     |           |       |
| Mercury                           | 0.00101 | 0.000007        | 0.000100        | mg/L  | 0.00100     | ND   | 101  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2018 11:47

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0171 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte                 | Result  | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|-----------------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0171-BLK1)</b>       |         |                 |                 |       |             | Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 09:29                    |      |             |     |           |       |
| Mercury                           | ND      | 0.000007        | 0.000100        | mg/L  |             |  |      |             |     |           | U     |
| <b>Duplicate (BGJ0171-DUP1)</b>   |         |                 |                 |       |             | Source: 18I0318-30 Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 09:36 |      |             |     |           |       |
| Mercury                           | ND      | 0.000007        | 0.000100        | mg/L  |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BGJ0171-MS1)</b> |         |                 |                 |       |             | Source: 18I0318-30 Prepared: 04-Oct-2018 Analyzed: 05-Oct-2018 09:39 |      |             |     |           |       |
| Mercury                           | 0.00106 | 0.000007        | 0.000100        | mg/L  | 0.00100     | ND   | 106  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**Wet Chemistry - Quality Control**

**Batch BGI0696 - EPA 9045D**

Instrument: Accumet AR60 Analyst: KLE

| QC Sample/Analyte               | Result | Detection Limit | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-----------------|----------|-------------|--|------|-------------|------|-----------|-------|
| <b>LCS (BGI0696-BS1)</b>        |        |                 |                 |          |             | Prepared: 26-Sep-2018 Analyzed: 26-Sep-2018 13:08                    |      |             |      |           |       |
| pH                              | 7.01   | 0.01            | 0.01            | pH Units | 7.00        |  | 100  | 0-200       |      |           |       |
| <b>Duplicate (BGI0696-DUP1)</b> |        |                 |                 |          |             | Source: 18I0318-01 Prepared: 26-Sep-2018 Analyzed: 26-Sep-2018 13:08 |      |             |      |           |       |
| pH                              | 6.37   | 0.01            | 0.01            | pH Units |             | 6.34   |      |             | 0.47 | 20        |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

**Wet Chemistry - Quality Control**

**Batch BGI0697 - EPA 9045D**

Instrument: Accumet AR60 Analyst: KLE

| QC Sample/Analyte        | Result | Detection Limit | Reporting Limit | Units    | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|--------------------------|--------|-----------------|-----------------|----------|-------------|---|------|-------------|-----|-----------|-------|
| <b>LCS (BGI0697-BS1)</b> |        |                 |                 |          |             | Prepared: 26-Sep-2018 Analyzed: 26-Sep-2018 13:08 |      |             |     |           |       |
| pH                       | 7.03   | 0.01            | 0.01            | pH Units | 7.00        |   | 100  | 0-200       |     |           |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
09-Oct-2018 11:47

**Certified Analyses included in this Report**

| Analyte                   | Certifications             |
|---------------------------|----------------------------|
| <b>EPA 6010C in Solid</b> |                            |
| Arsenic                   | NELAP,WADOE,DoD-ELAP,ADEC  |
| Silver                    | NELAP,WADOE,DoD-ELAP       |
| Arsenic                   | CALAP,NELAP,WADOE          |
| Barium                    | CALAP,NELAP,WADOE          |
| Cadmium                   | NELAP,WADOE,DoD-ELAP       |
| Chromium                  | NELAP,WADOE,DoD-ELAP       |
| Lead                      | NELAP,WADOE,DoD-ELAP       |
| Selenium                  | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 7470A in Solid</b> |                            |
| Mercury                   | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b> |                            |
| pH                        | WADOE,CALAP,DoD-ELAP,NELAP |

| Code     | Description  | Number       | Expires    |
|----------|--|--------------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | 17-015       | 02/07/2019 |
| CALAP    | California Department of Public Health CAELAP      | 2748         | 06/30/2019 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169        | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006-011 | 05/12/2019 |
| WADOE    | WA Dept of Ecology                                 | C558         | 06/30/2019 |
| WA-DW    | Ecology - Drinking Water                           | C558         | 06/30/2019 |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2018 11:47

### Notes and Definitions

- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- J Estimated concentration value detected below the reporting limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- U This analyte is not detected above the applicable reporting or detection limit.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



15 October 2018

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
18I0334

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|   |   |                               |
|---|---|-------------------------------|
| ARI Assigned Number:<br><b>1810334</b>                        | Turn-around Requested:<br><b>Normal</b> | Date:<br><b>9/21/18</b>       |
| ARI Client Company:<br><b>Pioneer Technologies</b>            | Phone:<br><b>360-570-1700</b>           | Page:<br><b>1</b> of <b>2</b> |
| Client Contact:<br><b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers:<br><b>1</b>             | Cooler Temps:<br><b>17</b>    |

| Sample ID   | Date                            | Time                        | Matrix | No. Containers | Analysis Requested                    |   |                     |                                 |  |  |  | Notes/Comments |  |
|---|---------------------------------|-----------------------------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|----------------|--|
|   |                                 |                             |        |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |                |  |
| SO-PTC-120-092118-9.0-10.0  | 9/21/18                         | 0930                        | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-120-092118-9.0-10.0-(10)   | 9/21/18                         | 0930                        | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| SO-PTC-120-092118-11.0-12.0   | 9/21/18                         | 0945                        | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-120-092118-11.0-12.0-(10)  | 9/21/18                         | 0945                        | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| SO-PTC-108-092118-12.0-12.5   | 9/21/18                         | 1045                        | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-108-092118-12.0-12.5-(10)  | 9/21/18                         | 1045                        | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| SO-PTC-108-092118-13.2-14.2   | 9/21/18                         | 1100                        | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-108-092118-13.2-14.2-(10)  | 9/21/18                         | 1100                        | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| SO-PTC-102-092118-7.5-8.5   | 9/21/18                         | 1245                        | SO     | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |                |  |
| SO-PTC-102-092118-7.5-8.5(10)   | 9/21/18                         | 1245                        | SO     | 1-4oz          |                                       | X   |                     |                                 |  |  |  |                |  |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature) | Received by:<br>(Signature) |        |                | Relinquished by:<br>(Signature)       |   |                     | Received by:<br>(Signature)     |  |  |  |                |  |
|   | Printed Name:                   | Printed Name:               |        |                | Printed Name:                         |   |                     | Printed Name:                   |  |  |  |                |  |
|   | Company:                        | Company:                    |        |                | Company:                              |   |                     | Company:                        |  |  |  |                |  |
|   | Date & Time:                    | Date & Time:                |        |                | Date & Time:                          |   |                     | Date & Time:                    |  |  |  |                |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|   |   |                               |
|---|---|-------------------------------|
| ARI Assigned Number:<br><b>1810334</b>                        | Turn-around Requested:<br><b>Normal</b> | Date:<br><b>9/21/18</b>       |
| ARI Client Company:<br><b>Pioneer Technologies</b>            | Phone:<br><b>360-570-1700</b>           | Page:<br><b>2</b> of <b>2</b> |
| Client Contact:<br><b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers:<br><b>1</b>             | Cooler Temps:<br><b>17</b>    |

| Sample ID  | Date   | Time   | Matrix                          | No. Containers              | Analysis Requested                    |   |                     |                                 |  |  |  | Notes/Comments |
|--|--|--|---------------------------------|-----------------------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|----------------|
|  |  |  |                                 |                             | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |                |
| SO-PTC-102-092118-14.5-15.0  | 9/21/18  | 1300<br><del>1500</del> <i>OK</i>              | SO                              | 1 8oz                       | X                                     |   | X                   |                                 |  |  |  |                |
| SO-PTC-102-092118-14.5-15.0(10)  | 9/21/18  | 1300<br><del>1500</del> <i>OK</i>              | SO                              | 1 4oz                       |                                       | X   |                     |                                 |  |  |  |                |
| SO-PTC-103-092118-7.5-8.5  | 9/21/18  | 1400   | SO                              | 1-8oz                       | X                                     |   | X                   |                                 |  |  |  |                |
| SO-PTC-103-092118-7.5-8.5-(10)   | 9/21/18  | 1400   | SO                              | 1-4oz                       |                                       | X   |                     |                                 |  |  |  |                |
| SO-PTC-103-092118-12.8-13.8  | 9/21/18  | 1410   | SO                              | 1-8oz.                      | X                                     |   | X                   |                                 |  |  |  |                |
| SO-PTC-103-092118-12.8-13.8-(10)   | 9/21/18  | 1410   | SO                              | 1-4oz.                      |                                       | X   |                     |                                 |  |  |  |                |
| Comments/Special Instructions  | Relinquished by:<br>(Signature) <i>[Signature]</i> | Received by:<br>(Signature) <i>[Signature]</i> | Relinquished by:<br>(Signature) | Received by:<br>(Signature) |                                       |   |                     |                                 |  |  |  |                |
| Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Printed Name:<br><b>A. CERRETTI</b>                | Printed Name:<br><b>Stephanie Fisnel</b>       | Printed Name:                   | Printed Name:               |                                       |   |                     |                                 |  |  |  |                |
|  | Company:<br><b>DOF</b>                             | Company:<br><b>ARI</b>                         | Company:                        | Company:                    |                                       |   |                     |                                 |  |  |  |                |
|  | Date & Time:<br><b>9/21/18 1537</b>                | Date & Time:<br><b>9-21-18 1537</b>            | Date & Time:                    | Date & Time:                |                                       |   |                     |                                 |  |  |  |                |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

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Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-120-092118-9.0-10.0       | 18I0334-01    | Solid  | 21-Sep-2018 09:30 | 22-Sep-2018 15:37 |
| SO-PTC-120-092118-9.0-10.0-(10)  | 18I0334-02    | Solid  | 21-Sep-2018 09:30 | 22-Sep-2018 15:37 |
| SO-PTC-120-092118-11.0-12.0      | 18I0334-03    | Solid  | 21-Sep-2018 09:45 | 22-Sep-2018 15:37 |
| SO-PTC-120-092118-11.0-12.0-(10) | 18I0334-04    | Solid  | 21-Sep-2018 09:45 | 22-Sep-2018 15:37 |
| SO-PTC-108-092118-12.0-12.5      | 18I0334-05    | Solid  | 21-Sep-2018 10:45 | 22-Sep-2018 15:37 |
| SO-PTC-108-092118-12.0-12.5-(10) | 18I0334-06    | Solid  | 21-Sep-2018 10:45 | 22-Sep-2018 15:37 |
| SO-PTC-108-092118-13.2-14.2      | 18I0334-07    | Solid  | 21-Sep-2018 11:00 | 22-Sep-2018 15:37 |
| SO-PTC-108-092118-13.2-14.2-(10) | 18I0334-08    | Solid  | 21-Sep-2018 11:00 | 22-Sep-2018 15:37 |
| SO-PTC-102-092118-7.5-8.5        | 18I0334-09    | Solid  | 21-Sep-2018 12:45 | 22-Sep-2018 15:37 |
| SO-PTC-102-092118-7.5-8.5-(10)   | 18I0334-10    | Solid  | 21-Sep-2018 12:45 | 22-Sep-2018 15:37 |
| SO-PTC-102-092118-14.5-15.0      | 18I0334-11    | Solid  | 21-Sep-2018 13:00 | 22-Sep-2018 15:37 |
| SO-PTC-102-092118-14.5-15.0-(10) | 18I0334-12    | Solid  | 21-Sep-2018 13:00 | 22-Sep-2018 15:37 |
| SO-PTC-103-092118-7.5-8.5        | 18I0334-13    | Solid  | 21-Sep-2018 14:00 | 22-Sep-2018 15:37 |
| SO-PTC-103-092118-7.5-8.5-(10)   | 18I0334-14    | Solid  | 21-Sep-2018 14:00 | 22-Sep-2018 15:37 |
| SO-PTC-103-092118-12.8-13.8      | 18I0334-15    | Solid  | 21-Sep-2018 14:10 | 22-Sep-2018 15:37 |
| SO-PTC-103-092118-12.8-13.8-(10) | 18I0334-16    | Solid  | 21-Sep-2018 14:10 | 22-Sep-2018 15:37 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 21, 2018 under ARI work order 1810334. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total Arsenic - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-120-092118-9.0-10.0. The matrix spike has a natural Arsenic concentration that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Arsenic has been flagged with an "HC" qualifier on the matrix spike. The results are advisory. The duplicate RPD was within QC limits. No further corrective action was taken.

### TCLP Metals

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Barium detected above the reporting limit. This is caused by the filter used for prep. Associated detected results and QC have been flagged with "B" qualifiers. There were no other target metals detected above the reporting limits in the method blanks. The method blank also has Cadmium detected below the reporting limit, but above the method detection limit. The Cadmium has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-120-092118-9.0-10.0-(10). The duplicate has Barium and Cadmium concentrations  $\leq 5$  times the reporting limits, the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. These metals have been flagged with "L" qualifiers on the duplicate. The results are advisory. All other matrix spike percent recoveries and duplicate RPD were within QC limits. No further corrective action was taken.

### TCLP Hg

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.



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**Reported:**  
15-Oct-2018 17:05

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-120-092118-9.0-10.0-(10). The matrix spike has high spike recovery. The results are advisory. The duplicate RPD was within QC limits. No corrective action was taken.

**pH - EPA Method 9045D**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample SO-PTC-120-092118-9.0-10.0. The duplicate RPD was within QC limits.





# Cooler Receipt Form

ARI Client: Pioneer I DOF  
 COC No(s): \_\_\_\_\_ NA  
 Assigned ARI Job No: 18I0334

Project Name: Arkema  
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO  
 Were custody papers included with the cooler? YES NO  
 Were custody papers properly filled out (ink, signed, etc.) YES NO  
 Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
 Time: 1537 17  
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D002565  
 Cooler Accepted by: Self Date: 9-21-18 Time: 1537

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

Was a temperature blank included in the cooler? YES NO  
 What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? NA YES NO  
 Were all bottles sealed in individual plastic bags? YES NO  
 Did all bottles arrive in good condition (unbroken)? YES NO  
 Were all bottle labels complete and legible? YES NO  
 Did the number of containers listed on COC match with the number of containers received? YES NO  
 Did all bottle labels and tags agree with custody papers? YES NO  
 Were all bottles used correct for the requested analyses? YES NO  
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO  
 Were all VOC vials free of air bubbles? NA YES NO  
 Was sufficient amount of sample sent in each bottle? YES NO  
 Date VOC Trip Blank was made at ARI: NA  
 Was Sample Split by ARI: NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_  
 Samples Logged by: JSW Date: 09/22/18 Time: 1155

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_ Date: \_\_\_\_\_

|   |                                 |
|---|---------------------------------|
| Small Air Bubbles<br>~ 2mm<br>Peabubbles<br>2-4 mm<br>LARGE Air Bubbles<br>> 4 mm | Small → "sm" (< 2 mm)           |
|   | Peabubbles → "pb" (2 to < 4 mm) |
|   | Large → "lg" (4 to < 6 mm)      |
|   | Headspace → "hs" (> 6 mm)       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-120-092118-9.0-10.0**  
**1810334-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/21/2018 09:30  
Instrument: ICP2 Analyst: MCB Analyzed: 11-Oct-2018 01:45

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.78 g  
Preparation Batch: BGJ0177 % Solids: 74.90  
Prepared: 04-Oct-2018 Sample Size: 1.045 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.50            | 16.0            | 765    | mg/kg | D     |



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Olympia WA, 98503

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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-120-092118-9.0-10.0**  
**1810334-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/21/2018 09:30

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.05 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | 7.67   | pH Units |       |





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Reported:  
15-Oct-2018 17:05

**SO-PTC-120-092118-9.0-10.0-(10)**  
**18I0334-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 09:30

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 03:38

Sample Preparation:

Preparation Method: LEN Digestion of EPA 1311 Elutriate

Preparation Batch: BGJ0253

Sample Size: 25 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|----------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | 4.17   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | 0.0137 | mg/L  | J, B  |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | 0.0053 | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND     | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND     | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND     | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-120-092118-9.0-10.0-(10)**  
**18I0334-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/21/2018 09:30

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:08

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000007</b> | mg/L  | J     |



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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-120-092118-11.0-12.0**  
**18I0334-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/21/2018 09:45  
Instrument: ICP2 Analyst: MCB Analyzed: 11-Oct-2018 01:19

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.62 g  
Preparation Batch: BGJ0177 % Solids: 59.18  
Prepared: 04-Oct-2018 Sample Size: 1.048 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.89            | 20.2            | <b>3850</b> | mg/kg | D     |



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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-120-092118-11.0-12.0**  
**18I0334-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/21/2018 09:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.03 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.18</b> | pH Units |       |



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Olympia WA, 98503

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Reported:  
15-Oct-2018 17:05

**SO-PTC-120-092118-11.0-12.0-(10)**  
**18I0334-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 09:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 03:08

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.784</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0996</b> | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0028</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0044</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-120-092118-11.0-12.0-(10)**  
**18I0334-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/21/2018 09:45

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:15

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-108-092118-12.0-12.5**  
**18I0334-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 10:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 01:23

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Prepared: 04-Oct-2018

Sample Size: 1.021 g (wet)

Final Volume: 50 mL

Dry Weight: 0.77 g

% Solids: 75.88

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.52            | 16.1            | <b>825</b> | mg/kg | D     |



Pioneer Technologies Corporation  
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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-108-092118-12.0-12.5**  
**18I0334-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/21/2018 10:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.07 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.93</b> | pH Units |       |





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Reported:  
15-Oct-2018 17:05

**SO-PTC-108-092118-12.0-12.5-(10)**  
**18I0334-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 10:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 03:12

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>15.8</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.118</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0171</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0029</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-108-092118-12.0-12.5-(10)**  
**18I0334-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/21/2018 10:45

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:17

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000008</b> | mg/L  | J     |



Pioneer Technologies Corporation  
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Reported:  
15-Oct-2018 17:05

**SO-PTC-108-092118-13.2-14.2**  
**18I0334-07 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 11:00

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 01:27

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Prepared: 04-Oct-2018

Sample Size: 1.045 g (wet)

Final Volume: 50 mL

Dry Weight: 0.42 g

% Solids: 40.25

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 2.79            | 29.7            | <b>11000</b> | mg/kg | D     |



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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-108-092118-13.2-14.2**  
**18I0334-07 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/21/2018 11:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.01 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>5.12</b> | pH Units |       |



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Reported:  
15-Oct-2018 17:05

**SO-PTC-108-092118-13.2-14.2-(10)**  
**18I0334-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 11:00

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 03:17

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>13.4</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.142</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0146</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0079</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-108-092118-13.2-14.2-(10)**  
**1810334-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/21/2018 11:00

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:20

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-102-092118-7.5-8.5**  
**18I0334-09 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 12:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 04:21

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Prepared: 04-Oct-2018

Sample Size: 1.118 g (wet)

Final Volume: 50 mL

Dry Weight: 0.66 g

% Solids: 59.27

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic | 7440-38-2  | 100      | 35.5            | 377             | <b>165000</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-102-092118-7.5-8.5**  
**18I0334-09 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/21/2018 12:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.05 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | 7.72   | pH Units |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

**SO-PTC-102-092118-7.5-8.5-(10)**  
**18I0334-10 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 12:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 03:21

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>124</b>    | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.181</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.403</b>  | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0051</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | <b>1.86</b>   | mg/L  |       |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

**SO-PTC-102-092118-7.5-8.5-(10)**  
**18I0334-10 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/21/2018 12:45

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 12:28

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|---------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Mercury | 7439-97-6  | 10       | 0.000070        | 0.00100         | <b>0.0244</b> | mg/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-102-092118-14.5-15.0**  
**18I0334-11 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/21/2018 13:00  
Instrument: ICP2 Analyst: MCB Analyzed: 11-Oct-2018 01:31

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.67 g  
Preparation Batch: BGJ0177 % Solids: 60.29  
Prepared: 04-Oct-2018 Sample Size: 1.105 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.76            | 18.8            | <b>9770</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-102-092118-14.5-15.0**  
**18I0334-11 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/21/2018 13:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.06 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.16</b> | pH Units |       |



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Reported:  
15-Oct-2018 17:05

**SO-PTC-102-092118-14.5-15.0-(10)**  
**18I0334-12 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 13:00

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 04:04

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 10       | 0.0280          | 0.500           | <b>239</b>    | mg/L  | D     |
| Barium   | 7440-39-3  | 10       | 0.0149          | 0.0300          | <b>0.291</b>  | mg/L  | D, B  |
| Cadmium  | 7440-43-9  | 10       | 0.0012          | 0.0200          | <b>0.221</b>  | mg/L  | D     |
| Chromium | 7440-47-3  | 10       | 0.0047          | 0.0500          | <b>0.0192</b> | mg/L  | J, D  |
| Lead     | 7439-92-1  | 10       | 0.0130          | 0.200           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 10       | 0.0816          | 0.500           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 10       | 0.0044          | 0.0300          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
15-Oct-2018 17:05

**SO-PTC-102-092118-14.5-15.0-(10)**  
**18I0334-12 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/21/2018 13:00

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:24

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000339</b> | mg/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-103-092118-7.5-8.5**  
**18I0334-13 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/21/2018 14:00  
Instrument: ICP2 Analyst: MCB Analyzed: 11-Oct-2018 02:43

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.86 g  
Preparation Batch: BGJ0177 % Solids: 82.97  
Prepared: 04-Oct-2018 Sample Size: 1.032 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.37            | 14.6            | <b>1500</b> | mg/kg | D     |



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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-103-092118-7.5-8.5**  
**18I0334-13 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/21/2018 14:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.03 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.00</b> | pH Units |       |





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Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

**SO-PTC-103-092118-7.5-8.5-(10)**  
**18I0334-14 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 14:00

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 03:25

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>45.5</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.121</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0408</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | <b>0.0160</b> | mg/L  | J     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-103-092118-7.5-8.5-(10)**  
**18I0334-14 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/21/2018 14:00

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:32

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000039</b> | mg/L  | J     |



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**Reported:**  
15-Oct-2018 17:05

**SO-PTC-103-092118-12.8-13.8**  
**18I0334-15 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/21/2018 14:10  
Instrument: ICP2 Analyst: MCB Analyzed: 11-Oct-2018 02:47

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.42 g  
Preparation Batch: BGJ0177 % Solids: 40.39  
Prepared: 04-Oct-2018 Sample Size: 1.046 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 2.78            | 29.6            | <b>5820</b> | mg/kg | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-103-092118-12.8-13.8**  
**18I0334-15 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/21/2018 14:10

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.1 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.54</b> | pH Units |       |



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Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

**SO-PTC-103-092118-12.8-13.8-(10)**  
**18I0334-16 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/21/2018 14:10

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 03:29

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 10       | 0.0280          | 0.500           | <b>194</b>    | mg/L  | D     |
| Barium   | 7440-39-3  | 10       | 0.0149          | 0.0300          | <b>0.137</b>  | mg/L  | D, B  |
| Cadmium  | 7440-43-9  | 10       | 0.0012          | 0.0200          | <b>0.189</b>  | mg/L  | D     |
| Chromium | 7440-47-3  | 10       | 0.0047          | 0.0500          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 10       | 0.0130          | 0.200           | <b>0.0239</b> | mg/L  | J, D  |
| Selenium | 7782-49-2  | 10       | 0.0816          | 0.500           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 10       | 0.0044          | 0.0300          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**SO-PTC-103-092118-12.8-13.8-(10)**  
**18I0334-16 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/21/2018 14:10

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:34

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000043</b> | mg/L  | J     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

**Metals and Metallic Compounds - Quality Control**

**Batch BGJ0177 - SWC EPA 3050B**

Instrument: ICP2 Analyst: MCB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|------|-------------|-------|-----------|-------|
| <b>Blank (BGJ0177-BLK1)</b>       |        |                 |                 |       |             | Prepared: 04-Oct-2018 Analyzed: 11-Oct-2018 01:15                    |      |             |       |           |       |
| Arsenic                           | ND     | 0.470           | 5.00            | mg/kg |             |  |      |             |       |           | U     |
| <b>LCS (BGJ0177-BS1)</b>          |        |                 |                 |       |             | Prepared: 04-Oct-2018 Analyzed: 11-Oct-2018 01:52                    |      |             |       |           |       |
| Arsenic                           | 193    | 0.470           | 5.00            | mg/kg | 200         |  | 96.4 | 80-120      |       |           |       |
| <b>Duplicate (BGJ0177-DUP1)</b>   |        |                 |                 |       |             | Source: 18I0334-01 Prepared: 04-Oct-2018 Analyzed: 11-Oct-2018 01:41 |      |             |       |           |       |
| Arsenic                           | 627    | 1.50            | 16.0            | mg/kg |             | 765  |      |             | 19.90 | 20        | D     |
| <b>Matrix Spike (BGJ0177-MS1)</b> |        |                 |                 |       |             | Source: 18I0334-01 Prepared: 04-Oct-2018 Analyzed: 11-Oct-2018 01:48 |      |             |       |           |       |
| Arsenic                           | 879    | 1.50            | 15.9            | mg/kg | 255         | 765  | 44.7 | 75-125      |       |           | HC, D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0253 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: MCB

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|-----------|-------------|-------|-----------|-------|
| <b>Blank (BGJ0253-BLK1)</b>       |        |                 |                 |       |             |  |           |             |       |           |       |
|                                   |        |                 |                 |       |             | Prepared: 08-Oct-2018 Analyzed: 11-Oct-2018 03:04                    |           |             |       |           |       |
| Arsenic                           | ND     | 0.0140          | 0.250           | mg/L  |             |  |           |             |       |           | U     |
| Barium                            | 0.102  | 0.0075          | 0.0150          | mg/L  |             |  |           |             |       |           |       |
| Cadmium                           | 0.0041 | 0.0006          | 0.0100          | mg/L  |             |  |           |             |       |           | J     |
| Chromium                          | ND     | 0.0024          | 0.0250          | mg/L  |             |  |           |             |       |           | U     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             |  |           |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250           | mg/L  |             |  |           |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150          | mg/L  |             |  |           |             |       |           | U     |
| <b>Duplicate (BGJ0253-DUP1)</b>   |        |                 |                 |       |             |  |           |             |       |           |       |
|                                   |        |                 |                 |       |             | Source: 18I0334-02 Prepared: 08-Oct-2018 Analyzed: 11-Oct-2018 03:34 |           |             |       |           |       |
| Barium                            | 0.0215 | 0.0075          | 0.0150          | mg/L  |             | 0.0137   |           |             | 44.40 | 20        | B, L  |
| Cadmium                           | 0.0079 | 0.0006          | 0.0100          | mg/L  |             | 0.0053   |           |             | 40.70 | 20        | L, J  |
| Chromium                          | ND     | 0.0024          | 0.0250          | mg/L  |             | ND   |           |             |       |           | U     |
| Lead                              | ND     | 0.0065          | 0.100           | mg/L  |             | ND   |           |             |       |           | U     |
| Selenium                          | 0.0463 | 0.0408          | 0.250           | mg/L  |             | ND   |           |             |       |           | J     |
| Silver                            | 0.0026 | 0.0022          | 0.0150          | mg/L  |             | ND   |           |             |       |           | J     |
| <b>Duplicate (BGJ0253-DUP2)</b>   |        |                 |                 |       |             |  |           |             |       |           |       |
|                                   |        |                 |                 |       |             | Source: 18I0334-02 Prepared: 08-Oct-2018 Analyzed: 12-Oct-2018 11:32 |           |             |       |           |       |
| Arsenic                           | 4.04   | 0.0140          | 0.250           | mg/L  |             | 4.17   |           |             | 3.02  | 20        |       |
| <b>Matrix Spike (BGJ0253-MS1)</b> |        |                 |                 |       |             |  |           |             |       |           |       |
|                                   |        |                 |                 |       |             | Source: 18I0334-02 Prepared: 08-Oct-2018 Analyzed: 11-Oct-2018 03:42 |           |             |       |           |       |
| Arsenic                           | 6.14   | 0.0140          | 0.250           | mg/L  | 2.00        | 4.17   | 98.7      | 75-125      |       |           |       |
| Barium                            | 1.98   | 0.0075          | 0.0150          | mg/L  | 2.00        | 0.0137   | 98.1      | 75-125      |       |           | B     |
| Cadmium                           | 0.522  | 0.0006          | 0.0100          | mg/L  | 0.500       | 0.0053   | 103       | 75-125      |       |           |       |
| Chromium                          | 0.516  | 0.0024          | 0.0250          | mg/L  | 0.500       | ND   | 103       | 75-125      |       |           |       |
| Lead                              | 2.01   | 0.0065          | 0.100           | mg/L  | 2.00        | ND   | 100       | 75-125      |       |           |       |
| Selenium                          | 2.21   | 0.0408          | 0.250           | mg/L  | 2.00        | ND   | 110       | 75-125      |       |           |       |
| Silver                            | 0.524  | 0.0022          | 0.0150          | mg/L  | 0.500       | ND   | 105       | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.





|  |  |                                |
|--|--|--------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | Reported:<br>15-Oct-2018 17:05 |
|--|--|--------------------------------|

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0255 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte                 | Result  | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|-----------------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0255-BLK1)</b>       |         |                 |                 |       |             | Prepared: 08-Oct-2018 Analyzed: 08-Oct-2018 11:06                    |      |             |     |           |       |
| Mercury                           | ND      | 0.000007        | 0.000100        | mg/L  |             |  |      |             |     |           | U     |
| <b>Duplicate (BGJ0255-DUP1)</b>   |         |                 |                 |       |             | Source: 18I0334-02 Prepared: 08-Oct-2018 Analyzed: 08-Oct-2018 11:11 |      |             |     |           |       |
| Mercury                           | ND      | 0.000007        | 0.000100        | mg/L  |             | 0.000007   |      |             |     |           | U     |
| <b>Matrix Spike (BGJ0255-MS1)</b> |         |                 |                 |       |             | Source: 18I0334-02 Prepared: 08-Oct-2018 Analyzed: 08-Oct-2018 11:13 |      |             |     |           |       |
| Mercury                           | 0.00133 | 0.000007        | 0.000100        | mg/L  | 0.00100     | 0.000007   | 133  | 75-125      |     |           | *     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**Wet Chemistry - Quality Control**

**Batch BGI0697 - EPA 9045D**

Instrument: Accumet AR60 Analyst: KLE

| QC Sample/Analyte               | Result | Detection Limit | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-----------------|----------|-------------|--|------|-------------|------|-----------|-------|
| <b>LCS (BGI0697-BS1)</b>        |        |                 |                 |          |             | Prepared: 26-Sep-2018 Analyzed: 26-Sep-2018 13:08                    |      |             |      |           |       |
| pH                              | 7.03   | 0.01            | 0.01            | pH Units | 7.00        |  | 100  | 0-200       |      |           |       |
| <b>Duplicate (BGI0697-DUP1)</b> |        |                 |                 |          |             | Source: 18I0334-01 Prepared: 26-Sep-2018 Analyzed: 26-Sep-2018 13:08 |      |             |      |           |       |
| pH                              | 7.64   | 0.01            | 0.01            | pH Units |             | 7.67   |      |             | 0.39 | 20        |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:05

**Certified Analyses included in this Report**

| Analyte                   | Certifications             |
|---------------------------|----------------------------|
| <b>EPA 6010C in Solid</b> |                            |
| Arsenic                   | NELAP,WADOE,DoD-ELAP,ADEC  |
| Silver                    | NELAP,WADOE,DoD-ELAP       |
| Arsenic                   | CALAP,NELAP,WADOE          |
| Barium                    | CALAP,NELAP,WADOE          |
| Cadmium                   | NELAP,WADOE,DoD-ELAP       |
| Chromium                  | NELAP,WADOE,DoD-ELAP       |
| Lead                      | NELAP,WADOE,DoD-ELAP       |
| Selenium                  | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 7470A in Solid</b> |                            |
| Mercury                   | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b> |                            |
| pH                        | WADOE,CALAP,DoD-ELAP,NELAP |

| Code     | Description  | Number       | Expires    |
|----------|--|--------------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | 17-015       | 02/07/2019 |
| CALAP    | California Department of Public Health CAELAP      | 2748         | 06/30/2019 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169        | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006-011 | 05/12/2019 |
| WADOE    | WA Dept of Ecology                                 | C558         | 06/30/2019 |
| WA-DW    | Ecology - Drinking Water                           | C558         | 06/30/2019 |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:05

### Notes and Definitions

- \* Flagged value is not within established control limits.
- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- J Estimated concentration value detected below the reporting limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- U This analyte is not detected above the applicable reporting or detection limit.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



15 October 2018

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
18I0353

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|  |                                  |                      |
|--|----------------------------------|----------------------|
| ARI Assigned Number:<br>1810353                        | Turn-around Requested:<br>Normal | Date:<br>9/24/18     |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>1 of 2      |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) | No. of Coolers:<br>1             | Cooler Temps:<br>8.1 |

| Client Project Name:<br>Arkema FS DG Inv  |                                 |                                     |        |                             | Analysis Requested                    |   |                                 |                                 |  |                             |             | Notes/Comments |  |
|---|---------------------------------|-------------------------------------|--------|-----------------------------|---------------------------------------|---|---------------------------------|---------------------------------|--|-----------------------------|-------------|----------------|--|
| Client Project #:<br>79227  |                                 | Samplers:<br>DG Cooper 206-660-3466 |        |                             | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045)             | Water: Dissolved As (EPA 6020A) |  |                             |             |                |  |
| Sample ID   | Date                            | Time                                | Matrix | No. Containers              |                                       |   |                                 |                                 |  |                             |             |                |  |
| SO-PTC-109-092418-5.0-6.0   | 9/24/18                         | 0945                                | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |             |                |  |
| SO-PTC-109-092418-5.0-6.0-(10)  | 9/24/18                         | 0945                                | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |             |                |  |
| SO-PTC-109-092418-13.0-14.0-(10)  | 9/24/18                         | 1000                                | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |             |                |  |
| SO-PTC-109-092418-13.0-14.0   | 9/24/18                         | 1000                                | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |             |                |  |
| SO-PTC-107-092418-6.0-7.0   | 9/24/18                         | 1130                                | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |             |                |  |
| SO-PTC-107-092418-6.0-7.0-(10)  | 9/24/18                         | 1130                                | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |             |                |  |
| SO-PTC-107-092418-11.0-12.0   | 9/24/18                         | 1145                                | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |             |                |  |
| SO-PTC-107-092418-11.0-12.0-(10)  | 9/24/18                         | 1145                                | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |             |                |  |
| EB-01-092418  | 9/24/18                         | 1245                                | WATER  | 1-500mL                     | X                                     |   | X                               |                                 |  |                             |             |                |  |
| EB-01-092418-(10)   | 9/24/18                         | 1245                                | WATER  | 1-500mL                     |                                       | X   |                                 |                                 |  |                             |             |                |  |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format<br>Bill to Port of Tacoma<br>PO#79227 | Relinquished by:<br>(Signature) | [Signature]                         |        | Received by:<br>(Signature) | [Signature]                           |   | Relinquished by:<br>(Signature) | [Signature]                     |  | Received by:<br>(Signature) | [Signature] |                |  |
|   | Printed Name:                   | A. CERUTI                           |        | Printed Name:               | Stephanie Fiswel                      |   | Printed Name:                   | [Blank]                         |  | Printed Name:               | [Blank]     |                |  |
|   | Company:                        | DOF                                 |        | Company:                    | ARI                                   |   | Company:                        | [Blank]                         |  | Company:                    | [Blank]     |                |  |
|   | Date & Time:                    | 9/24/18 1630                        |        | Date & Time:                | 9-24-18 1630                          |   | Date & Time:                    | [Blank]                         |  | Date & Time:                | [Blank]     |                |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request



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 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|   |   |                               |
|---|---|-------------------------------|
| ARI Assigned Number:<br><b>1810353</b>                        | Turn-around Requested:<br><b>Normal</b> | Date:<br><b>9/24/18</b>       |
| ARI Client Company:<br><b>Pioneer Technologies</b>            | Phone:<br><b>360-570-1700</b>           | Page:<br><b>2</b> of <b>2</b> |
| Client Contact:<br><b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers:<br><b>1</b>             | Cooler Temps:<br><b></b>      |

| Client Project Name:<br><b>Arkema FS DG Inv</b>   |   |  |   |                | Analysis Requested                    |   |                     |                                 |                             |  |  | Notes/Comments |
|---|---|--|---|----------------|---------------------------------------|---|---------------------|---------------------------------|-----------------------------|--|--|----------------|
| Client Project #:<br><b>79227</b>   |   | Samplers:<br><b>DG Cooper 206-660-3466</b> |   |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |                             |  |  |                |
| Sample ID   | Date  | Time                                       | Matrix  | No. Containers |                                       |   |                     |                                 |                             |  |  |                |
| SO-PTC-106-092418-7.0-8.0   | 9/24/18   | 1345                                       | SOIL  | 1-8oz          | X                                     |   | X                   |                                 |                             |  |  |                |
| SO-PTC-106-092418-7.0-8.0-(10)  | 9/24/18   | 1345                                       | SOIL  | 1-4oz          |                                       | X   |                     |                                 |                             |  |  |                |
| SO-PTC-106-092418-13.0-14.0   | 9/24/18   | 1400                                       | SOIL  | 1-8oz          | X                                     |   | X                   |                                 |                             |  |  |                |
| SO-PTC-106-092418-13.0-14.0-(10)  | 9/24/18   | 1400                                       | SOIL  | 1-4oz          |                                       | X   |                     |                                 |                             |  |  |                |
| SO-PTC-105-092418-8.0-9.0   | 9/24/18   | 1450                                       | SOIL  | 1-8oz          | X                                     |   | X                   |                                 |                             |  |  |                |
| SO-PTC-105-092418-8.0-9.0-(10)  | 9/24/18   | 1450                                       | SOIL  | 1-4oz          |                                       | X   |                     |                                 |                             |  |  |                |
| SO-PTC-105-092418-(01)  | 9/24/18   | 1455                                       | SOIL  | 1-8oz          | X                                     |   | X                   |                                 |                             |  |  |                |
| SO-PTC-105-092418-(11)  | 9/24/18   | 1455                                       | SOIL  | 1-4oz          |                                       | X   |                     |                                 |                             |  |  |                |
| SO-PTC-105-092418-13.0-14.0   | 9/24/18   | 1515                                       | SOIL  | 1-8oz          | X                                     |   | X                   |                                 |                             |  |  |                |
| SO-PTC-105-092418-13.0-14.0-(10)  | 9/24/18   | 1515                                       | SOIL  | 1-4oz          |                                       | X   |                     |                                 |                             |  |  |                |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature)<br><i>[Signature]</i> |  | Received by:<br>(Signature)<br><i>[Signature]</i> |                | Relinquished by:<br>(Signature)       |   |                     |                                 | Received by:<br>(Signature) |  |  |                |
|   | Printed Name:<br><b>A. CERUTI</b>                     |  | Printed Name:<br><b>Stephanie Fisher</b>          |                | Printed Name:                         |   |                     |                                 | Printed Name:               |  |  |                |
|   | Company:<br><b>DOF</b>                                |  | Company:<br><b>ARI</b>                            |                | Company:                              |   |                     |                                 | Company:                    |  |  |                |
|   | Date & Time:<br><b>9/24/18 1630</b>                   |  | Date & Time:<br><b>9-24-18 1630</b>               |                | Date & Time:                          |   |                     |                                 | Date & Time:                |  |  |                |

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|  |                                  |                      |
|--|----------------------------------|----------------------|
| ARI Assigned Number:<br>1810353                        | Turn-around Requested:<br>Normal | Date:<br>9/24/18     |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>1 of 2      |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) |                                  | No. of Coolers:<br>1 |
|  |                                  | Cooler Temps:<br>8.1 |

|  |                                     |                                       |   |                     |                                 |  |                |
|--|-------------------------------------|---------------------------------------|---|---------------------|---------------------------------|--|----------------|
| Client Project Name:<br>Arkema FS DG Inv | Analysis Requested                  |                                       |   |                     |                                 |  | Notes/Comments |
| Client Project #:<br>79227               | Samplers:<br>DG Cooper 206-660-3466 | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |                |

| Sample ID                        | Date    | Time | Matrix | No. Containers | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |  |  |  |  |
|----------------------------------|---------|------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|--|--|--|--|
| SO-PTC-109-092418-5.0-6.0        | 9/24/18 | 0945 | SOIL   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| SO-PTC-109-092418-5.0-6.0-(10)   | 9/24/18 | 0945 | SOIL   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| SO-PTC-109-092418-13.0-14.0-(10) | 9/24/18 | 1000 | SOIL   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| SO-PTC-109-092418-13.0-14.0      | 9/24/18 | 1000 | SOIL   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| SO-PTC-107-092418-6.0-7.0        | 9/24/18 | 1130 | SOIL   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| SO-PTC-107-092418-6.0-7.0-(10)   | 9/24/18 | 1130 | SOIL   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| SO-PTC-107-092418-11.0-12.0      | 9/24/18 | 1145 | SOIL   | 1-8oz          | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| SO-PTC-107-092418-11.0-12.0-(10) | 9/24/18 | 1145 | SOIL   | 1-4oz          |                                       | X   |                     |                                 |  |  |  |  |  |  |  |
| EB-01-092418                     | 9/24/18 | 1245 | WATER  | 1-500ml        | X                                     |   | X                   |                                 |  |  |  |  |  |  |  |
| EB-01-092418-(10)                | 9/24/18 | 1245 | WATER  | 1-500ml        |                                       | X   |                     |                                 |  |  |  |  |  |  |  |

|   |   |   |                                 |                             |
|---|---|---|---------------------------------|-----------------------------|
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature)<br><i>[Signature]</i> | Received by:<br>(Signature)<br><i>Stephanie Fiswell</i> | Relinquished by:<br>(Signature) | Received by:<br>(Signature) |
|   | Printed Name:<br>A. CERUTI                            | Printed Name:<br>Stephanie Fiswell                      | Printed Name:                   | Printed Name:               |
|   | Company:<br>DOF                                       | Company:<br>ARI   | Company:                        | Company:                    |
|   | Date & Time:<br>9/24/18 1630                          | Date & Time:<br>9-24-18 1630                            | Date & Time:                    | Date & Time:                |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|   |   |                               |
|---|---|-------------------------------|
| ARI Assigned Number:<br><b>1810353</b>                        | Turn-around Requested:<br><b>Normal</b> | Date:<br><b>9/24/18</b>       |
| ARI Client Company:<br><b>Pioneer Technologies</b>            | Phone:<br><b>360-570-1700</b>           | Page:<br><b>2</b> of <b>2</b> |
| Client Contact:<br><b>Troy Bussey (busseyt@uspioneer.com)</b> | No. of Coolers:<br><b>1</b>             | Cooler Temps:<br><b></b>      |

| Sample ID   | Date                            | Time         | Matrix | No. Containers              | Analysis Requested                    |   |                                 |                                 |  |                             |  | Notes/Comments |  |
|---|---------------------------------|--------------|--------|-----------------------------|---------------------------------------|---|---------------------------------|---------------------------------|--|-----------------------------|--|----------------|--|
|   |                                 |              |        |                             | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045)             | Water: Dissolved As (EPA 6020A) |  |                             |  |                |  |
| SO-PTC-106-092418-7.0-8.0   | 9/24/18                         | 1345         | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |  |                |  |
| SO-PTC-106-092418-7.0-8.0-(10)  | 9/24/18                         | 1345         | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |  |                |  |
| SO-PTC-106-092418-13.0-14.0   | 9/24/18                         | 1400         | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |  |                |  |
| SO-PTC-106-092418-13.0-14.0-(10)  | 9/24/18                         | 1400         | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |  |                |  |
| SO-PTC-105-092418-8.0-9.0   | 9/24/18                         | 1450         | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |  |                |  |
| SO-PTC-105-092418-8.0-9.0-(10)  | 9/24/18                         | 1450         | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |  |                |  |
| SO-PTC-105-092418-(01)  | 9/24/18                         | 1455         | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |  |                |  |
| SO-PTC-105-092418-(11)  | 9/24/18                         | 1455         | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |  |                |  |
| SO-PTC-105-092418-13.0-14.0   | 9/24/18                         | 1515         | SOIL   | 1-8oz                       | X                                     |   | X                               |                                 |  |                             |  |                |  |
| SO-PTC-105-092418-13.0-14.0(10)   | 9/24/18                         | 1515         | SOIL   | 1-4oz                       |                                       | X   |                                 |                                 |  |                             |  |                |  |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature) |              |        | Received by:<br>(Signature) |                                       |   | Relinquished by:<br>(Signature) |                                 |  | Received by:<br>(Signature) |  |                |  |
|   | Printed Name:                   | A. CERVUTI   |        | Printed Name:               | Stephanie Fisher                      |   | Printed Name:                   |                                 |  | Printed Name:               |  |                |  |
|   | Company:                        | DOF          |        | Company:                    | ARI                                   |   | Company:                        |                                 |  | Company:                    |  |                |  |
|   | Date & Time:                    | 9/24/18 1630 |        | Date & Time:                | 9-24-18 1630                          |   | Date & Time:                    |                                 |  | Date & Time:                |  |                |  |

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Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-109-092418-5.0-6.0        | 18I0353-01    | Solid  | 24-Sep-2018 09:45 | 24-Sep-2018 16:30 |
| SO-PTC-109-092418-5.0-6.0-(10)   | 18I0353-02    | Solid  | 24-Sep-2018 09:45 | 24-Sep-2018 16:30 |
| SO-PTC-109-092418-13.0-14.0-(10) | 18I0353-03    | Solid  | 24-Sep-2018 10:00 | 24-Sep-2018 16:30 |
| SO-PTC-109-092418-13.0-14.0      | 18I0353-04    | Solid  | 24-Sep-2018 10:00 | 24-Sep-2018 16:30 |
| SO-PTC-107-092418-6.0-7.0        | 18I0353-05    | Solid  | 24-Sep-2018 11:30 | 24-Sep-2018 16:30 |
| SO-PTC-107-092418-6.0-7.0-(10)   | 18I0353-06    | Solid  | 24-Sep-2018 11:30 | 24-Sep-2018 16:30 |
| SO-PTC-107-092418-11.0-12.0      | 18I0353-07    | Solid  | 24-Sep-2018 11:45 | 24-Sep-2018 16:30 |
| SO-PTC-107-092418-11.0-12.0-(10) | 18I0353-08    | Solid  | 24-Sep-2018 11:45 | 24-Sep-2018 16:30 |
| EB-01-092418                     | 18I0353-09    | Water  | 24-Sep-2018 12:45 | 24-Sep-2018 16:30 |
| EB-01-092418-(10)                | 18I0353-10    | Water  | 24-Sep-2018 12:45 | 24-Sep-2018 16:30 |
| SO-PTC-106-092418-7.0-8.0        | 18I0353-11    | Solid  | 24-Sep-2018 13:45 | 24-Sep-2018 16:30 |
| SO-PTC-106-092418-7.0-8.0-(10)   | 18I0353-12    | Solid  | 24-Sep-2018 13:45 | 24-Sep-2018 16:30 |
| SO-PTC-106-092418-13.0-14.0      | 18I0353-13    | Solid  | 24-Sep-2018 14:00 | 24-Sep-2018 16:30 |
| SO-PTC-106-092418-13.0-14.0-(10) | 18I0353-14    | Solid  | 24-Sep-2018 14:00 | 24-Sep-2018 16:30 |
| SO-PTC-105-092418-8.0-9.0        | 18I0353-15    | Solid  | 24-Sep-2018 14:50 | 24-Sep-2018 16:30 |
| SO-PTC-105-092418-8.0-9.0-(10)   | 18I0353-16    | Solid  | 24-Sep-2018 14:50 | 24-Sep-2018 16:30 |
| SO-PTC-105-092418-(01)           | 18I0353-17    | Solid  | 24-Sep-2018 14:55 | 24-Sep-2018 16:30 |
| SO-PTC-105-092418-(11)           | 18I0353-18    | Solid  | 24-Sep-2018 14:55 | 24-Sep-2018 16:30 |
| SO-PTC-105-092418-13.0-14.0      | 18I0353-19    | Solid  | 24-Sep-2018 15:15 | 24-Sep-2018 16:30 |
| SO-PTC-105-092418-13.0-14.0-(10) | 18I0353-20    | Solid  | 24-Sep-2018 15:15 | 24-Sep-2018 16:30 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 24, 2018 under ARI work order 1810353. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total Arsenic - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.

The LCS percent recoveries were within control limits.

### TCLP Metals

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Barium detected above the reporting limit. This is caused by the filter used for prep. Associated detected results and QC have been flagged with "B" qualifiers. There were no other target metals detected above the reporting limits in the method blanks. The method blank also has Cadmium detected below the reporting limit, but above the method detection limit. The Cadmium has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

### TCLP Hg

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank was clean at the reporting limits.

### pH - EPA Method 9045D

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The LCS percent recoveries were within control limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08





# Cooler Receipt Form

ARI Client: Dof/pioneer  
 COC No(s): \_\_\_\_\_ (NA)  
 Assigned ARI Job No: B10353

Project Name: Arkema  
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_ (NA)

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 8.1  
 Time: 1630

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: Danses

Cooler Accepted by: Set Date: 01-24-18 Time: 1630

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO

Were all VOC vials free of air bubbles? ..... NA YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI..... NA

Was Sample Split by ARI:  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: JCS Date: 9/25/18 Time: 0742

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_ Date: \_\_\_\_\_

|  |  |  |   |
|--|--|--|---|
|  |  |  | Small → "sm" (< 2 mm)<br>Peabubbles → "pb" (2 to < 4 mm)<br>Large → "lg" (4 to < 6 mm)<br>Headspace → "hs" (> 6 mm) |
|--|--|--|---|



WORK ORDER

18I0353

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type            | pH      |
|--------------|---------------------------|---------|
| 18I0353-01 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-02 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-03 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-04 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-05 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-06 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-07 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-08 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-09 A | HDPE NM, 500 mL, 1:1 HNO3 | L2 pass |
| 18I0353-10 A | HDPE NM, 500 mL           |         |
| 18I0353-11 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-12 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-13 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-14 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-15 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-16 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-17 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-18 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-19 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-20 A | Glass WM, Clear, 4 oz     |         |

JVB  
Preservation Confirmed By

9/25/18  
Date



# Cooler Temperature Compliance Form

ARI Work Order: 1810353

Cooler#: \_\_\_\_\_ Temperature(°C): 8.1

| Sample ID               | Bottle Count | Bottle Type |
|-------------------------|--------------|-------------|
| <u>Samples recieved</u> |              |             |
| <u>above 6°</u>         |              |             |
|                         |              |             |
|                         |              |             |
|                         |              |             |
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|                         |              |             |
|                         |              |             |
|                         |              |             |
|                         |              |             |
|                         |              |             |

Cooler#: \_\_\_\_\_ Temperature(°C): \_\_\_\_\_

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
|           |              |             |
|           |              |             |
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|           |              |             |

Cooler#: \_\_\_\_\_ Temperature(°C): \_\_\_\_\_

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
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|           |              |             |
|           |              |             |

Cooler#: \_\_\_\_\_ Temperature(°C): \_\_\_\_\_

| Sample ID | Bottle Count | Bottle Type |
|-----------|--------------|-------------|
|           |              |             |
|           |              |             |
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|           |              |             |

Completed by: \_\_\_\_\_

*SE*

Date: \_\_\_\_\_

9-24-18

Time: \_\_\_\_\_

1630

00070F

Cooler Temperature Compliance Form

Version 000  
3/3/09





WORK ORDER

18I0353

Client: Pioneer Technologies Corporation      Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio      Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type            | pH      |
|--------------|---------------------------|---------|
| 18I0353-01 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-02 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-03 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-04 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-05 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-06 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-07 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-08 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-09 A | HDPE NM, 500 mL, 1:1 HNO3 | L2 pass |
| 18I0353-10 A | HDPE NM, 500 mL           |         |
| 18I0353-11 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-12 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-13 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-14 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-15 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-16 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-17 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-18 A | Glass WM, Clear, 4 oz     |         |
| 18I0353-19 A | Glass WM, Clear, 8 oz     |         |
| 18I0353-20 A | Glass WM, Clear, 4 oz     |         |

JVB  
Preservation Confirmed By

9/25/18  
Date





WORK ORDER

18I0353

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |

| Analysis        | Due        | TAT | Expires    | Comments |
|-----------------|------------|-----|------------|----------|
| TCLP 6010C - Ag | 10/09/2018 | 10  | 3/23/2019  |          |
| TCLP 6010C - Cr | 10/09/2018 | 10  | 3/23/2019  |          |
| TCLP 6010C - Pb | 10/09/2018 | 10  | 3/23/2019  |          |
| TCLP 6010C - Se | 10/09/2018 | 10  | 3/23/2019  |          |
| TCLP Hg         | 10/09/2018 | 10  | 10/22/2018 |          |

**18I0353-17 SO-PTC-105-092418-(01) [Solid] Sampled 24-Sep-2018 14:55**

|  |            |    |            |  |
|--|------------|----|------------|--|
| pH, EPA 9045D, Solid                       | 10/09/2018 | 10 | 10/8/2018  |  |
| Solids, Total, Dried at 103 -105 °C, Solid | 10/09/2018 | 10 | 10/22/2018 |  |
| Solids, Total, Metals Correction           | 10/09/2018 | 10 | 10/22/2018 |  |
| Met 6010C - As                             | 10/09/2018 | 10 | 3/23/2019  |  |

**18I0353-18 SO-PTC-105-092418-(11) [Solid] Sampled 24-Sep-2018 14:55**

|                 |            |    |            |  |
|-----------------|------------|----|------------|--|
| TCLP Hg         | 10/09/2018 | 10 | 10/22/2018 |  |
| TCLP 6010C - Ba | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - As | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - Ag | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - Se | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 1311       | 10/09/2018 | 10 | 10/22/2018 |  |
| TCLP 6010C - Cr | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - Pb | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - Cd | 10/09/2018 | 10 | 3/23/2019  |  |

**18I0353-19 SO-PTC-105-092418-13.0-14.0 [Solid] Sampled 24-Sep-2018 15:15**

|  |            |    |            |  |
|--|------------|----|------------|--|
| Solids, Total, Metals Correction           | 10/09/2018 | 10 | 10/22/2018 |  |
| Solids, Total, Dried at 103 -105 °C, Solid | 10/09/2018 | 10 | 10/22/2018 |  |
| pH, EPA 9045D, Solid                       | 10/09/2018 | 10 | 10/8/2018  |  |
| Met 6010C - As                             | 10/09/2018 | 10 | 3/23/2019  |  |

**18I0353-20 SO-PTC-105-092418-13.0-14.0-(10) [Solid] Sampled 24-Sep-2018 15:15**

|                 |            |    |            |  |
|-----------------|------------|----|------------|--|
| TCLP Hg         | 10/09/2018 | 10 | 10/22/2018 |  |
| TCLP 6010C - Pb | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - As | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - Ag | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - Ba | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - Cr | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 6010C - Se | 10/09/2018 | 10 | 3/23/2019  |  |
| TCLP 1311       | 10/09/2018 | 10 | 10/22/2018 |  |
| TCLP 6010C - Cd | 10/09/2018 | 10 | 3/23/2019  |  |



# Cooler Temperature Compliance Form

|                                  |              |                             |
|----------------------------------|--------------|-----------------------------|
| ARI Work Order: <u>1810353</u>   |              |                             |
| Cooler#: _____                   |              | Temperature(°C): <u>8.1</u> |
| Sample ID                        | Bottle Count | Bottle Type                 |
| <i>Samples recieved above 6°</i> |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
| Cooler#: _____                   |              | Temperature(°C): _____      |
| Sample ID                        | Bottle Count | Bottle Type                 |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
| Cooler#: _____                   |              | Temperature(°C): _____      |
| Sample ID                        | Bottle Count | Bottle Type                 |
|                                  |              |                             |
|                                  |              |                             |
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|                                  |              |                             |
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|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
| Cooler#: _____                   |              | Temperature(°C): _____      |
| Sample ID                        | Bottle Count | Bottle Type                 |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
|                                  |              |                             |
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|                                  |              |                             |
|                                  |              |                             |

Completed by: *Set* Date: *9-24-18* Time: *1630*

00070F

Cooler Temperature Compliance Form

Version 000  
3/3/09



# Cooler Receipt Form

ARI Client: Dof/pioneer  
COC No(s): \_\_\_\_\_ (NA)  
Assigned ARI Job No: B10353

Project Name: Arkema  
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
Tracking No: \_\_\_\_\_ (NA)

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES NO  
Were custody papers included with the cooler? YES NO  
Were custody papers properly filled out (ink, signed, etc.) YES NO  
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 8.1  
Time: 1630  
If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DAN565  
Cooler Accepted by: Set Date: 01-24-18 Time: 1630

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

Was a temperature blank included in the cooler? YES NO  
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_  
Was sufficient ice used (if appropriate)? NA YES NO  
Were all bottles sealed in individual plastic bags? YES NO  
Did all bottles arrive in good condition (unbroken)? YES NO  
Were all bottle labels complete and legible? YES NO  
Did the number of containers listed on COC match with the number of containers received? YES NO  
Did all bottle labels and tags agree with custody papers? YES NO  
Were all bottles used correct for the requested analyses? YES NO  
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES NO  
Were all VOC vials free of air bubbles? NA YES NO  
Was sufficient amount of sample sent in each bottle? YES NO  
Date VOC Trip Blank was made at ARI: NA  
Was Sample Split by ARI: NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_  
Samples Logged by: JCS Date: 9/25/18 Time: 0742

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_ Date: \_\_\_\_\_

|                                   |                               |  |  |
|-----------------------------------|-------------------------------|--|--|
| <p>Small Air Bubbles<br/>~2mm</p> | <p>Peabubbles'<br/>2-4 mm</p> | <p>LARGE Air Bubbles<br/>&gt; 4 mm</p> | <p>Small → "sm" (&lt; 2 mm )</p> <p>Peabubbles → "pb" ( 2 to &lt; 4 mm )</p> <p>Large → "lg" ( 4 to &lt; 6 mm )</p> <p>Headspace → "hs" (&gt; 6 mm )</p> |
|-----------------------------------|-------------------------------|--|--|



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-109-092418-5.0-6.0**  
**1810353-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 09:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 07:55

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Prepared: 04-Oct-2018

Sample Size: 1.082 g (wet)

Final Volume: 50 mL

Dry Weight: 0.79 g

% Solids: 73.39

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.48            | 15.7            | <b>4700</b> | mg/kg | D     |



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Olympia WA, 98503

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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-109-092418-5.0-6.0**  
**1810353-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 09:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.34 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.79</b> | pH Units |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**SO-PTC-109-092418-5.0-6.0-(10)**  
**18I0353-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 09:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 07:08

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>65.6</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0769</b> | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0952</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0066</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-109-092418-5.0-6.0-(10)**  
**18I0353-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 09:45

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:36

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**SO-PTC-109-092418-13.0-14.0-(10)**  
**18I0353-03 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 10:00

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 07:12

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>30.6</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.113</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0513</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-109-092418-13.0-14.0-(10)**  
**18I0353-03 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 10:00

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:39

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-109-092418-13.0-14.0**  
**18I0353-04 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/24/2018 10:00  
Instrument: ICP2 Analyst: MCB Analyzed: 11-Oct-2018 07:59

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.43 g  
Preparation Batch: BGJ0177 % Solids: 42.20  
Prepared: 04-Oct-2018 Sample Size: 1.028 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 2.71            | 28.8            | <b>6340</b> | mg/kg | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-109-092418-13.0-14.0**  
**18I0353-04 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 10:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.01 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>4.94</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-107-092418-6.0-7.0**  
**1810353-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/24/2018 11:30  
Instrument: ICP2 Analyst: TCH Analyzed: 12-Oct-2018 11:28

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.86 g  
Preparation Batch: BGJ0177 % Solids: 82.87  
Prepared: 04-Oct-2018 Sample Size: 1.04 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.36            | 14.5            | <b>150</b> | mg/kg | D     |



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**Reported:**  
15-Oct-2018 17:08

**SO-PTC-107-092418-6.0-7.0**  
**1810353-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 11:30

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.22 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.95</b> | pH Units |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
15-Oct-2018 17:08

**SO-PTC-107-092418-6.0-7.0-(10)**  
**18I0353-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 11:30

Instrument: ICP2 Analyst: TCH

Analyzed: 12-Oct-2018 11:16

Sample Preparation:

Preparation Method: LEN Digestion of EPA 1311 Elutriate

Preparation Batch: BGJ0253

Sample Size: 25 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>4.03</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0829</b> | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0091</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0039</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-107-092418-6.0-7.0-(10)**  
**1810353-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 11:30

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:41

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-107-092418-11.0-12.0**  
**18I0353-07 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 11:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 08:07

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Prepared: 04-Oct-2018

Sample Size: 1.086 g (wet)

Final Volume: 50 mL

Dry Weight: 0.75 g

% Solids: 68.83

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.57            | 16.7            | <b>20.3</b> | mg/kg | D     |





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**Reported:**  
15-Oct-2018 17:08

**SO-PTC-107-092418-11.0-12.0**  
**18I0353-07 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 11:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.92</b> | pH Units |       |



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Reported:  
15-Oct-2018 17:08

**SO-PTC-107-092418-11.0-12.0-(10)**  
**1810353-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 11:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 07:21

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.418</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.183</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0034</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0156</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
15-Oct-2018 17:08

**SO-PTC-107-092418-11.0-12.0-(10)**  
**1810353-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 11:45

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:43

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000007</b> | mg/L  | J     |



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**Reported:**  
15-Oct-2018 17:08

**EB-01-092418**  
**18I0353-09 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 12:45

Instrument: ICP2 Analyst: MCB

Analyzed: 27-Sep-2018 16:44

Sample Preparation:

Preparation Method: TWC EPA 3010A

Preparation Batch: BGI0732

Sample Size: 25 mL

Prepared: 27-Sep-2018

Final Volume: 25 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 1        | 0.0047          | 0.0500          | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**EB-01-092418-(10)**  
**18I0353-10 (Water)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 12:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 03:56

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0254 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.0178</b> | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0180</b> | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0026</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0037</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | <b>0.0024</b> | mg/L  | J     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**EB-01-092418-(10)**  
**18I0353-10 (Water)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 12:45

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 12:05

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0256

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-106-092418-7.0-8.0**  
**1810353-11 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 13:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 08:11

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Prepared: 04-Oct-2018

Sample Size: 1.086 g (wet)

Final Volume: 50 mL

Dry Weight: 0.95 g

% Solids: 87.93

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.23            | 13.1            | <b>1430</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-106-092418-7.0-8.0**  
**18I0353-11 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 13:45

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.09 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>8.00</b> | pH Units |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**SO-PTC-106-092418-7.0-8.0-(10)**  
**18I0353-12 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 13:45

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 07:25

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>4.61</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0894</b> | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0244</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
15-Oct-2018 17:08

**SO-PTC-106-092418-7.0-8.0-(10)**  
**18I0353-12 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 13:45

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:49

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000010</b> | mg/L  | J     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-106-092418-13.0-14.0**  
**18I0353-13 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 14:00

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 08:15

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Prepared: 04-Oct-2018

Sample Size: 1.028 g (wet)

Final Volume: 50 mL

Dry Weight: 0.45 g

% Solids: 44.00

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 2.60            | 27.6            | <b>4690</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-106-092418-13.0-14.0**  
**18I0353-13 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 14:00

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.08 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>6.01</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**SO-PTC-106-092418-13.0-14.0-(10)**  
**18I0353-14 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 14:00

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 07:29

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>11.7</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.112</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0195</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0157</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-106-092418-13.0-14.0-(10)**  
**18I0353-14 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 14:00

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:51

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-8.0-9.0**  
**18I0353-15 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C Sampled: 09/24/2018 14:50  
Instrument: ICP2 Analyst: MCB Analyzed: 11-Oct-2018 08:19

Sample Preparation: Preparation Method: SWC EPA 3050B Dry Weight: 0.88 g  
Preparation Batch: BGJ0177 % Solids: 79.56  
Prepared: 04-Oct-2018 Sample Size: 1.103 g (wet)  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.34            | 14.2            | <b>1030</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-8.0-9.0**  
**1810353-15 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 14:50

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.22 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>9.88</b> | pH Units |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**SO-PTC-105-092418-8.0-9.0-(10)**  
**18I0353-16 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 14:50

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 07:33

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>5.20</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.137</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0116</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-8.0-9.0-(10)**  
**18I0353-16 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 14:50

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 11:54

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000144</b> | mg/L  |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-(01)**  
**18I0353-17 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 14:55

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 08:23

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Sample Size: 1.021 g (wet)

Dry Weight: 0.83 g

Prepared: 04-Oct-2018

Final Volume: 50 mL

% Solids: 81.29

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.42            | 15.1            | <b>1230</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-(01)**  
**18I0353-17 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 14:55

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.24 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>9.96</b> | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**SO-PTC-105-092418-(11)**  
**1810353-18 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 14:55

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 07:38

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0253 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>4.31</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.324</b>  | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0108</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0081</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-(11)**  
**18I0353-18 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 14:55

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 12:01

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0255

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000276</b> | mg/L  |       |



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**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-13.0-14.0**  
**18I0353-19 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 15:15

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 08:27

Sample Preparation:

Preparation Method: SWC EPA 3050B

Preparation Batch: BGJ0177

Prepared: 04-Oct-2018

Sample Size: 1.042 g (wet)

Final Volume: 50 mL

Dry Weight: 0.41 g

% Solids: 39.47

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 2.86            | 30.4            | <b>7940</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-13.0-14.0**  
**18I0353-19 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/24/2018 15:15

Instrument: Accumet AR60 Analyst: KLE

Analyzed: 26-Sep-2018 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BGI0697

Prepared: 26-Sep-2018

Sample Size: 20.11 g (wet)

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | 0.01            | <b>7.28</b> | pH Units |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**SO-PTC-105-092418-13.0-14.0-(10)**  
**18I0353-20 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 09/24/2018 15:15

Instrument: ICP2 Analyst: MCB

Analyzed: 11-Oct-2018 04:12

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BGJ0254 Sample Size: 25 mL (wet)  
Prepared: 08-Oct-2018 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>46.8</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0511</b> | mg/L  | B     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0400</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0145</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
15-Oct-2018 17:08

**SO-PTC-105-092418-13.0-14.0-(10)**  
**18I0353-20 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A

Sampled: 09/24/2018 15:15

Instrument: CVAA Analyst: DP

Analyzed: 08-Oct-2018 12:07

Sample Preparation:

Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg

Preparation Batch: BGJ0256

Sample Size: 20 mL (wet)

Prepared: 08-Oct-2018

Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000015</b> | mg/L  | J     |



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**Reported:**  
15-Oct-2018 17:08

**Metals and Metallic Compounds - Quality Control**

**Batch BGI0732 - TWC EPA 3010A**

Instrument: ICP2 Analyst: MCB

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGI0732-BLK1)</b> |        |                 |                 |       |             | Prepared: 27-Sep-2018 Analyzed: 27-Sep-2018 15:40 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0047          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BGI0732-BS1)</b>    |        |                 |                 |       |             | Prepared: 27-Sep-2018 Analyzed: 27-Sep-2018 15:44 |      |             |     |           |       |
| Arsenic                     | 2.07   | 0.0047          | 0.0500          | mg/L  | 2.00        |   | 103  | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**Metals and Metallic Compounds - Quality Control**

**Batch BGJ0177 - SWC EPA 3050B**

Instrument: ICP2 Analyst: MCB

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0177-BLK1)</b> |        |                 |                 |       |             | Prepared: 04-Oct-2018 Analyzed: 11-Oct-2018 01:15 |      |             |     |           |       |
| Arsenic                     | ND     | 0.470           | 5.00            | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BGJ0177-BS1)</b>    |        |                 |                 |       |             | Prepared: 04-Oct-2018 Analyzed: 11-Oct-2018 01:52 |      |             |     |           |       |
| Arsenic                     | 193    | 0.470           | 5.00            | mg/kg | 200         |   | 96.4 | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0253 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: MCB

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0253-BLK1)</b> |        |                 |                 |       |             | Prepared: 08-Oct-2018 Analyzed: 11-Oct-2018 03:04 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0140          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Barium                      | 0.102  | 0.0075          | 0.0150          | mg/L  |             |   |      |             |     |           |       |
| Cadmium                     | 0.0041 | 0.0006          | 0.0100          | mg/L  |             |   |      |             |     |           | J     |
| Chromium                    | ND     | 0.0024          | 0.0250          | mg/L  |             |   |      |             |     |           | U     |
| Lead                        | ND     | 0.0065          | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| Selenium                    | ND     | 0.0408          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Silver                      | ND     | 0.0022          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0254 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: MCB

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0254-BLK1)</b> |        |                 |                 |       |             | Prepared: 08-Oct-2018 Analyzed: 11-Oct-2018 02:17 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0140          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Barium                      | 0.0786 | 0.0075          | 0.0150          | mg/L  |             |   |      |             |     |           |       |
| Cadmium                     | 0.0024 | 0.0006          | 0.0100          | mg/L  |             |   |      |             |     |           | J     |
| Chromium                    | ND     | 0.0024          | 0.0250          | mg/L  |             |   |      |             |     |           | U     |
| Lead                        | ND     | 0.0065          | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| Selenium                    | ND     | 0.0408          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Silver                      | ND     | 0.0022          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>15-Oct-2018 17:08 |
|--|--|---------------------------------------|

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0255 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0255-BLK1)</b> |        |                 |                 |       |             | Prepared: 08-Oct-2018 Analyzed: 08-Oct-2018 11:06 |      |             |     |           |       |
| Mercury                     | ND     | 0.000007        | 0.000100        | mg/L  |             |   |      |             |     |           | U     |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>15-Oct-2018 17:08 |
|--|--|---------------------------------------|

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BGJ0256 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CVAA Analyst: DP

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0256-BLK1)</b> |        |                 |                 |       |             | Prepared: 08-Oct-2018 Analyzed: 08-Oct-2018 12:03 |      |             |     |           |       |
| Mercury                     | ND     | 0.000007        | 0.000100        | mg/L  |             |   |      |             |     |           | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

**Wet Chemistry - Quality Control**

**Batch BGI0697 - EPA 9045D**

Instrument: Accumet AR60 Analyst: KLE

| QC Sample/Analyte        | Result | Detection Limit | Reporting Limit | Units    | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|--------------------------|--------|-----------------|-----------------|----------|-------------|---|------|-------------|-----|-----------|-------|
| <b>LCS (BGI0697-BS1)</b> |        |                 |                 |          |             | Prepared: 26-Sep-2018 Analyzed: 26-Sep-2018 13:08 |      |             |     |           |       |
| pH                       | 7.03   | 0.01            | 0.01            | pH Units | 7.00        |   | 100  | 0-200       |     |           |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
15-Oct-2018 17:08

**Certified Analyses included in this Report**

| Analyte                   | Certifications             |
|---------------------------|----------------------------|
| <b>EPA 6010C in Solid</b> |                            |
| Arsenic                   | NELAP,WADOE,DoD-ELAP,ADEC  |
| Silver                    | NELAP,WADOE,DoD-ELAP       |
| Arsenic                   | CALAP,NELAP,WADOE          |
| Barium                    | CALAP,NELAP,WADOE          |
| Cadmium                   | NELAP,WADOE,DoD-ELAP       |
| Chromium                  | NELAP,WADOE,DoD-ELAP       |
| Lead                      | NELAP,WADOE,DoD-ELAP       |
| Selenium                  | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 6010C in Water</b> |                            |
| Arsenic                   | WADOE,NELAP,ADEC,DoD-ELAP  |
| <b>EPA 7470A in Solid</b> |                            |
| Mercury                   | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b> |                            |
| pH                        | WADOE,CALAP,DoD-ELAP,NELAP |

| Code     | Description  | Number       | Expires    |
|----------|--|--------------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | 17-015       | 02/07/2019 |
| CALAP    | California Department of Public Health CAELAP      | 2748         | 06/30/2019 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169        | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006-011 | 05/12/2019 |
| WADOE    | WA Dept of Ecology                                 | C558         | 06/30/2019 |
| WA-DW    | Ecology - Drinking Water                           | C558         | 06/30/2019 |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
15-Oct-2018 17:08

### Notes and Definitions

- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- J Estimated concentration value detected below the reporting limit.
- U This analyte is not detected above the applicable reporting or detection limit.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



22 October 2018

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gaps 2018

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
18J0149

Associated SDG ID(s)  
N/A

-----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|  |   |                  |
|--|---|------------------|
| ARI Assigned Number:<br>18J0149                        | Turn-around Requested:<br>Normal          | Date:<br>10/5/18 |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700                    | Page:<br>1 of 4  |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) | No. of Coolers:<br>Cooler Temps:<br>0.8°C |                  |

| Client Project Name:<br>Arkema FS DG Inv  |   | Analysis Requested                                |   |                                 |                                 |  |  |  |   |  |  | Notes/Comments |
|---|---|---|---|---------------------------------|---------------------------------|--|--|--|---|--|--|----------------|
| Client Project #:<br>79227  | Samplers:<br>DG Cooper 206-660-3466       | Soil: Total Arsenic (EPA 3050B/6010C)             | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045)             | Water: Dissolved As (EPA 6020A) |  |  |  |   |  |  |                |
| Sample ID   | Date                                      | Time  | Matrix  | No. Containers                  |                                 |  |  |  |   |  |  |                |
| GW-8G2-1-100218-(20)  | 10/2/18                                   | 1500  | W   | 1-500ml                         |                                 |  |  |  | X |  |  | FIELD FILTERED |
| GW-7E6-2-100318-(20)  | 10/3/18                                   | 1400  | W   | 1-500ml                         |                                 |  |  |  | X |  |  | 0.45 μm        |
| GW-7E7-2-100318-(20)  | 10/3/18                                   | 1240  | W   | 1-500ml                         |                                 |  |  |  | X |  |  |                |
| GW-7E10-1-100318-(20)   | 10/3/18                                   | 1115  | W   | 1-500ml                         |                                 |  |  |  | X |  |  |                |
| GW-7F2-1-100318-(20)  | 10/3/18                                   | 1000  | W   | 1-500ml                         |                                 |  |  |  | X |  |  |                |
| GW-7F3-1-100318-(20)  | 10/3/18                                   | 1045  | W   | 1-500ml                         |                                 |  |  |  | X |  |  |                |
| GW-7E9-2-100318-(20)  | 10/3/18                                   | 1200  | W   | 1-500ml                         |                                 |  |  |  | X |  |  |                |
| GW-7E8-1-100318-(20)  | 10/3/18                                   | 1330  | W   | 1-500ml                         |                                 |  |  |  | X |  |  |                |
| GW-6E12-2-100318-(20)   | 10/3/18                                   | 1430  | W   | 1-500ml                         |                                 |  |  |  | X |  |  |                |
| GW-7F4-1-100518-(20)  | 10/5/18                                   | 0900  | W   | 1-500ml                         |                                 |  |  |  | X |  |  |                |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature) <i>AG</i> | Received by:<br>(Signature) <i>Jasmine Bauman</i> |   | Relinquished by:<br>(Signature) | Received by:<br>(Signature)     |  |  |  |   |  |  |                |
|   | Printed Name:<br>A. CERUTI                | Printed Name:<br>Jasmine Bauman                   |   | Printed Name:                   | Printed Name:                   |  |  |  |   |  |  |                |
|   | Company:<br>DOF                           | Company:<br>ARI                                   |   | Company:                        | Company:                        |  |  |  |   |  |  |                |
|   | Date & Time:<br>10/5/18 1500              | Date & Time:<br>10/5/18 1500                      |   | Date & Time:                    | Date & Time:                    |  |  |  |   |  |  |                |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request



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 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|  |                                  |                  |
|--|----------------------------------|------------------|
| ARI Assigned Number:<br>18J0149                        | Turn-around Requested:<br>Normal | Date:<br>10/5/18 |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>2 of 4  |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) | No. of Coolers:                  | Cooler Temps:    |

| Client Project Name:<br>Arkema FS DG Inv  |                                 |                                     |                                 |                | Analysis Requested                    |   |                     |                                 |  |  |  | Notes/Comments |
|---|---------------------------------|-------------------------------------|---------------------------------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|----------------|
| Client Project #:<br>79227  |                                 | Samplers:<br>DG Cooper 206-660-3466 |                                 |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |                |
| Sample ID   | Date                            | Time                                | Matrix                          | No. Containers |                                       |   |                     |                                 |  |  |  |                |
| GW-6E9-2-100418-(20)  | 10/4/18                         | 1115                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  | FIELD FILTERED |
| GW-6E6-1-100418-(20)  | 10/4/18                         | 1215                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  | 0.45 µg/l      |
| GW-7E3-1-100418-(20)  | 10/4/18                         | 1030                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  |                |
| GW-6D14-1-100418-(20)   | 10/4/18                         | 1315                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  |                |
| GW-6E1-1-100418-(20)  | 10/4/18                         | 1400                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  |                |
| GW-6D25-1-100418-(20)   | 10/4/18                         | 1500                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  |                |
| GW-6D25-2-100418-(20)   | 10/4/18                         | 1530                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  |                |
| GW-5C21-2-100418-(20)   | 10/4/18                         | 1610                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  |                |
| GW-7E16-2-100418-(20)   | 10/4/18                         | 1615                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  |                |
| GW-EB-EB-100518-(20)  | 10/5/18                         | 1000                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  |                |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature) |                                     | Received by:<br>(Signature)     |                | Relinquished by:<br>(Signature)       |   |                     | Received by:<br>(Signature)     |  |  |  |                |
|   | Printed Name:<br>A. CERUTTI     |                                     | Printed Name:<br>Jasmine Barmen |                | Printed Name:                         |   |                     | Printed Name:                   |  |  |  |                |
|   | Company:<br>DOF                 |                                     | Company:<br>ARI                 |                | Company:                              |   |                     | Company:                        |  |  |  |                |
|   | Date & Time:<br>10/5/18 1500    |                                     | Date & Time:<br>10/5/18 1500    |                | Date & Time:                          |   |                     | Date & Time:                    |  |  |  |                |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request



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 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|  |                                  |                  |
|--|----------------------------------|------------------|
| ARI Assigned Number:<br>18J049                         | Turn-around Requested:<br>Normal | Date:<br>10/5/18 |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>3 of 4  |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) | No. of Coolers:                  | Cooler Temps:    |

| Client Project Name:<br>Arkema FS DG Inv  |                                 |                                     |                                 |                | Analysis Requested                    |   |                     |                                 |  |  |  | Notes/Comments |
|---|---------------------------------|-------------------------------------|---------------------------------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|----------------|
| Client Project #:<br>79227  |                                 | Samplers:<br>DG Cooper 206-660-3466 |                                 |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |                |
| Sample ID   | Date                            | Time                                | Matrix                          | No. Containers |                                       |   |                     |                                 |  |  |  |                |
| GW-5C12-1-10052018-(20)   | 10/5/18                         | 1100                                | W                               | 1-500mL        |                                       |   |                     | X                               |  |  |  | FIELD FILTERED |
| GW-5C13-1-10052018-(20)   | 10/5/18                         | 1000                                |                                 |                |                                       |   |                     | X                               |  |  |  | 0.45µm         |
| GW-5D2-1R-10052018-(20)   | 10/5/18                         | 0945                                |                                 |                |                                       |   |                     | X                               |  |  |  |                |
| GW-5D2-1R-10052018-(21)   | 10/5/18                         | 0950                                |                                 |                |                                       |   |                     | X                               |  |  |  |                |
| GW-5C16-2R-10052018-(20)  | 10/5/18                         | 1200                                |                                 |                |                                       |   |                     | X                               |  |  |  |                |
| GW-5C16-1R-10052018-(20)  | 10/5/18                         | 1230                                |                                 |                |                                       |   |                     | X                               |  |  |  |                |
| GW-4C1-1-10052018-(20)  | 10/5/18                         | 1345                                |                                 |                |                                       |   |                     | X                               |  |  |  |                |
| GW-4D1-1-10052018-(20)  | 10/5/18                         | 1415                                |                                 |                |                                       |   |                     | X                               |  |  |  |                |
| GW-6E5-1-10052018-(20)  | 10/5/18                         | 1420                                |                                 |                |                                       |   |                     |                                 |  |  |  |                |
| GW-5E4-1-10052018-(20)  | 10/5/18                         | 1230                                |                                 |                |                                       |   |                     |                                 |  |  |  |                |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature) |                                     | Received by:<br>(Signature)     |                | Relinquished by:<br>(Signature)       |   |                     | Received by:<br>(Signature)     |  |  |  |                |
|   | Printed Name:<br>A. CERNUTI     |                                     | Printed Name:<br>Jasmine Bauman |                | Printed Name:                         |   |                     | Printed Name:                   |  |  |  |                |
|   | Company:<br>DOF                 |                                     | Company:<br>ARI                 |                | Company:                              |   |                     | Company:                        |  |  |  |                |
|   | Date & Time:<br>10/5/18 1500    |                                     | Date & Time:<br>10/5/18 1500    |                | Date & Time:                          |   |                     | Date & Time:                    |  |  |  |                |

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# Chain of Custody Record & Laboratory Analysis Request



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

|  |                                  |                  |
|--|----------------------------------|------------------|
| ARI Assigned Number:<br>18J0149                        | Turn-around Requested:<br>Normal | Date:<br>10/5/18 |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>4 of 4  |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) | No. of Coolers:                  | Cooler Temps:    |

| Sample ID   | Date                            | Time                        | Matrix | No. Containers | Analysis Requested                    |   |                     |                                 |  |  |  | Notes/Comments |                          |
|---|---------------------------------|-----------------------------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|----------------|--------------------------|
|   |                                 |                             |        |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |                |                          |
| GW-5D7-1R-10052018-(20)   | 10/5/18                         | 1115                        | W      | 1-500ml        |                                       |   |                     | X                               |  |  |  |                | FIELD FILTERED<br>0.45µm |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
|   |                                 |                             |        |                |                                       |   |                     |                                 |  |  |  |                |                          |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by:<br>(Signature) | Received by:<br>(Signature) |        |                | Relinquished by:<br>(Signature)       | Received by:<br>(Signature)   |                     |                                 |  |  |  |                |                          |
|   | Printed Name:                   | Printed Name:               |        |                | Printed Name:                         | Printed Name:   |                     |                                 |  |  |  |                |                          |
|   | Company:                        | Company:                    |        |                | Company:                              | Company:  |                     |                                 |  |  |  |                |                          |
|   | Date & Time:                    | Date & Time:                |        |                | Date & Time:                          | Date & Time:  |                     |                                 |  |  |  |                |                          |

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# Chain of Custody Record & Laboratory Analysis Request

|  |                                  |   |
|--|----------------------------------|---|
| ARI Assigned Number:<br>18J0149                        | Turn-around Requested:<br>Normal | Date:<br>10/5/18                          |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>1 of 4                           |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) |                                  | No. of Coolers:<br>Cooler Temps:<br>0.8°C |



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Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)

| Client Project Name:<br>Arkema FS DG Inv  |                             |                                     |        |                             | Analysis Requested                    |  |                     |                                 |  |  |  |  | Notes/Comments |  |
|---|-----------------------------|-------------------------------------|--------|-----------------------------|---------------------------------------|--|---------------------|---------------------------------|--|--|--|--|----------------|--|
| Client Project #:<br>79227  |                             | Samplers:<br>DG Cooper 206-660-3466 |        |                             | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As,Ba,Cd,Cr,Pb,Hg,Se,Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |  |                |  |
| Sample ID   | Date                        | Time                                | Matrix | No. Containers              |                                       |  |                     |                                 |  |  |  |  |                |  |
| GW-8G2-1-100218-(20)  | 10/2/18                     | 1500                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  | FIELD FILTERED |  |
| GW-7E6-2-100318-(20)  | 10/3/18                     | 1400                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  | 0.45 mg/l      |  |
| GW-7E7-2-100318-(20)  | 10/3/18                     | 1240                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  |                |  |
| GW-7E10-1-100318-(20)   | 10/3/18                     | 1115                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  |                |  |
| GW-7F2-1-100318-(20)  | 10/3/18                     | 1000                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  |                |  |
| GW-7F3-1-100318-(20)  | 10/3/18                     | 1045                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  |                |  |
| GW-7E9-2-100318-(20)  | 10/3/18                     | 1200                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  |                |  |
| GW-7E8-1-100318-(20)  | 10/3/18                     | 1330                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  |                |  |
| GW-6E12-2-100318-(20)   | 10/3/18                     | 1430                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  |                |  |
| GW-7F4-1-100518-(20)  | 10/5/18                     | 0900                                | W      | 1-500mL                     |                                       |  |                     | X                               |  |  |  |  |                |  |
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by (Signature) | Received by (Signature)             |        | Relinquished by (Signature) | Received by (Signature)               |  |                     |                                 |  |  |  |  |                |  |
|   | Printed Name                | Printed Name                        |        | Printed Name                | Printed Name                          |  |                     |                                 |  |  |  |  |                |  |
|   | Company                     | Company                             |        | Company                     | Company                               |  |                     |                                 |  |  |  |  |                |  |
|   | Date & Time                 | Date & Time                         |        | Date & Time                 | Date & Time                           |  |                     |                                 |  |  |  |  |                |  |
|   | 10/5/18                     | 1500                                |        | 10/5/18                     | 1500                                  |  |                     |                                 |  |  |  |  |                |  |

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# Chain of Custody Record & Laboratory Analysis Request

|  |                                  |                                  |
|--|----------------------------------|----------------------------------|
| ARI Assigned Number:<br>18J0149                        | Turn-around Requested:<br>Normal | Date:<br>10/5/18                 |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>2 of 4                  |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) |                                  | No. of Coolers:<br>Cooler Temps: |



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Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)

|  |                                     |                                       |   |                     |                                 |                |
|--|-------------------------------------|---------------------------------------|---|---------------------|---------------------------------|----------------|
| Client Project Name:<br>Arkema FS DG Inv | Analysis Requested                  |                                       |   |                     |                                 | Notes/Comments |
| Client Project #:<br>79227               | Samplers:<br>DG Cooper 206-660-3466 | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |                |

| Sample ID             | Date    | Time | Matrix | No. Containers | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) | Notes/Comments |
|-----------------------|---------|------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|----------------|
| GW-6E9-2-100418-(20)  | 10/4/18 | 1115 | W      | 1-500mL        |                                       |   |                     | X                               | FIELD FILTERED |
| GW-6E6-1-100418-(20)  | 10/4/18 | 1215 | W      | 1-500mL        |                                       |   |                     | X                               | 0.45 mL        |
| GW-7E3-1-100418-(20)  | 10/4/18 | 1030 | W      | 1-500mL        |                                       |   |                     | X                               |                |
| GW-6D14-1-100418-(20) | 10/4/18 | 1315 | W      | 1-500mL        |                                       |   |                     | X                               |                |
| GW-6E1-1-100418-(20)  | 10/4/18 | 1400 | W      | 1-500mL        |                                       |   |                     | X                               |                |
| GW-6D25-1-100418-(20) | 10/4/18 | 1500 | W      | 1-500mL        |                                       |   |                     | X                               |                |
| GW-6D25-2-100418-(20) | 10/4/18 | 1530 | W      | 1-500mL        |                                       |   |                     | X                               |                |
| GW-5C21-2-100418-(20) | 10/4/18 | 1610 | W      | 1-500mL        |                                       |   |                     | X                               |                |
| GW-7E16-2-100418-(20) | 10/4/18 | 1615 | W      | 1-500mL        |                                       |   |                     | X                               |                |
| GW-EB-EB-100518-(20)  | 10/5/18 | 1000 | W      | 1-500mL        |                                       |   |                     | X                               |                |

|   |                                  |                                 |                              |                          |
|---|----------------------------------|---------------------------------|------------------------------|--------------------------|
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by (Signature):<br> | Received by (Signature):<br>    | Relinquished by (Signature): | Received by (Signature): |
|   | Printed Name:<br>A. CERUTTI      | Printed Name:<br>Jasmine Berman | Printed Name:                | Printed Name:            |
|   | Company:<br>DOF                  | Company:<br>ARI                 | Company:                     | Company:                 |
|   | Date & Time:<br>10/5/18 1500     | Date & Time:<br>10/5/18 1500    | Date & Time:                 | Date & Time:             |

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# Chain of Custody Record & Laboratory Analysis Request

|  |                                  |                                  |
|--|----------------------------------|----------------------------------|
| ARI Assigned Number:<br>18J0149                        | Turn-around Requested:<br>Normal | Date:<br>10/5/18                 |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>3 of 4                  |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) |                                  | No. of Coolers:<br>Cooler Temps: |



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206-695-6200 206-695-6201 (fax)

|  |                                     |                                       |   |                     |                                 |  |                |
|--|-------------------------------------|---------------------------------------|---|---------------------|---------------------------------|--|----------------|
| Client Project Name:<br>Arkema FS DG Inv | Analysis Requested                  |                                       |   |                     |                                 |  | Notes/Comments |
| Client Project #:<br>79227               | Samplers:<br>DG Cooper 206-660-3466 | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag) (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |                |

| Sample ID                | Date    | Time | Matrix | No. Containers | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals (As, Ba, Cd, Cr, Pb, Hg, Se, Ag) (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |  |  |  |  |  |                |
|--------------------------|---------|------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|--|--|--|--|--|----------------|
| GW-5C12-1-10052018-(20)  | 10/5/18 | 1100 | W      | 1-500mL        |                                       |   |                     | X                               |  |  |  |  |  |  |  |  | FIELD FILTERED |
| GW-5C13-1-10052018-(20)  | 10/5/18 | 1000 |        |                |                                       |   |                     | X                               |  |  |  |  |  |  |  |  | 0.45µm         |
| GW-5D2-1R-10052018-(20)  | 10/5/18 | 0945 |        |                |                                       |   |                     | X                               |  |  |  |  |  |  |  |  |                |
| GW-5D2-1R-10052018-(21)  | 10/5/18 | 0950 |        |                |                                       |   |                     | X                               |  |  |  |  |  |  |  |  |                |
| GW-5C16-2R-10052018-(20) | 10/5/18 | 1200 |        |                |                                       |   |                     | X                               |  |  |  |  |  |  |  |  |                |
| GW-5C16-1R-10052018-(20) | 10/5/18 | 1230 |        |                |                                       |   |                     | X                               |  |  |  |  |  |  |  |  |                |
| GW-4C1-1-10052018-(20)   | 10/5/18 | 1345 |        |                |                                       |   |                     | X                               |  |  |  |  |  |  |  |  |                |
| GW-4D1-1-10052018-(20)   | 10/5/18 | 1415 |        |                |                                       |   |                     | X                               |  |  |  |  |  |  |  |  |                |
| GW-6E5-1-10052018-(20)   | 10/5/18 | 1420 |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |                |
| GW-5E4-1-10052018-(20)   | 10/5/18 | 1230 |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |                |

|   |                                  |                                 |                              |                          |
|---|----------------------------------|---------------------------------|------------------------------|--------------------------|
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|   | Printed Name:<br>A CERUTTI       | Printed Name:<br>Jasmine Bawmen | Printed Name:                | Printed Name:            |
|   | Company:<br>DOF                  | Company:<br>ARI                 | Company:                     | Company:                 |
|   | Date & Time:<br>10/5/18 1500     | Date & Time:<br>10/5/18 1500    | Date & Time:                 | Date & Time:             |

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# Chain of Custody Record & Laboratory Analysis Request

|  |                                  |                                  |
|--|----------------------------------|----------------------------------|
| ARI Assigned Number:<br>1850149                        | Turn-around Requested:<br>Normal | Date:<br>10/5/18                 |
| ARI Client Company:<br>Pioneer Technologies            | Phone:<br>360-570-1700           | Page:<br>4 of 4                  |
| Client Contact:<br>Troy Bussey (busseyt@uspioneer.com) |                                  | No. of Coolers:<br>Cooler Temps: |



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 206-695-6200 206-695-6201 (fax)

|  |                                     |                                       |   |                     |                                 |  |  |                |
|--|-------------------------------------|---------------------------------------|---|---------------------|---------------------------------|--|--|----------------|
| Client Project Name:<br>Arkema FS DG Inv | Analysis Requested                  |                                       |   |                     |                                 |  |  | Notes/Comments |
| Client Project #:<br>79227               | Samplers:<br>DG Cooper 206-660-3466 | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |                |

| Sample ID               | Date    | Time | Matrix | No. Containers | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |  |  |  |  |  |  |                          |
|-------------------------|---------|------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|--|--|--|--|--|--|--------------------------|
| GW-507-1R-10052018-(20) | 10/5/18 | 1115 | W      | 1-500ml        |                                       |   |                     | X                               |  |  |  |  |  |  |  |  |  | FIELD FILTERED<br>0.45µm |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |
|                         |         |      |        |                |                                       |   |                     |                                 |  |  |  |  |  |  |  |  |  |                          |

|   |                              |                              |                              |                          |
|---|------------------------------|------------------------------|------------------------------|--------------------------|
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by (Signature): | Received by (Signature):     | Relinquished by (Signature): | Received by (Signature): |
|   | Printed Name: A. CERRATTI    | Printed Name: Jasmine Bowman | Printed Name:                | Printed Name:            |
|   | Company: DOF                 | Company: ARI                 | Company:                     | Company:                 |
|   | Date & Time: 10/5/18 1506    | Date & Time: 10/5/18 1500    | Date & Time:                 | Date & Time:             |

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Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Oct-2018 15:25

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID              | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|------------------------|---------------|--------|-------------------|-------------------|
| GW-8G2-1-100218-(20)   | 18J0149-01    | Water  | 02-Oct-2018 15:00 | 05-Oct-2018 15:00 |
| GW-7E6-2-100318-(20)   | 18J0149-02    | Water  | 03-Oct-2018 14:00 | 05-Oct-2018 15:00 |
| GW-7E7-2-100318-(20)   | 18J0149-03    | Water  | 03-Oct-2018 12:40 | 05-Oct-2018 15:00 |
| GW-7E10-1-100318-(20)  | 18J0149-04    | Water  | 03-Oct-2018 11:15 | 05-Oct-2018 15:00 |
| GW-7F2-1-100318-(20)   | 18J0149-05    | Water  | 03-Oct-2018 10:00 | 05-Oct-2018 15:00 |
| GW-7F3-1-100318-(20)   | 18J0149-06    | Water  | 03-Oct-2018 10:45 | 05-Oct-2018 15:00 |
| GW-7E9-2-100318-(20)   | 18J0149-07    | Water  | 03-Oct-2018 12:00 | 05-Oct-2018 15:00 |
| GW-7E8-1-100318-(20)   | 18J0149-08    | Water  | 03-Oct-2018 13:30 | 05-Oct-2018 15:00 |
| GW-6E12-2-100318-(20)  | 18J0149-09    | Water  | 03-Oct-2018 14:30 | 05-Oct-2018 15:00 |
| GW-7F4-1-100518-(20)   | 18J0149-10    | Water  | 05-Oct-2018 09:00 | 05-Oct-2018 15:00 |
| GW-6E9-2-100418-(20)   | 18J0149-11    | Water  | 04-Oct-2018 11:15 | 05-Oct-2018 15:00 |
| GW-6E6-1-100418-(20)   | 18J0149-12    | Water  | 04-Oct-2018 12:15 | 05-Oct-2018 15:00 |
| GW-7E3-1-100418-(20)   | 18J0149-13    | Water  | 04-Oct-2018 10:30 | 05-Oct-2018 15:00 |
| GW-6D14-1-100418-(20)  | 18J0149-14    | Water  | 04-Oct-2018 13:15 | 05-Oct-2018 15:00 |
| GW-6E1-1-100418-(20)   | 18J0149-15    | Water  | 04-Oct-2018 14:00 | 05-Oct-2018 15:00 |
| GW-6D25-1-100418-(20)  | 18J0149-16    | Water  | 04-Oct-2018 15:00 | 05-Oct-2018 15:00 |
| GW-6D25-2-100418-(20)  | 18J0149-17    | Water  | 04-Oct-2018 15:30 | 05-Oct-2018 15:00 |
| GW-5C21-2-100418-(20)  | 18J0149-18    | Water  | 04-Oct-2018 16:10 | 05-Oct-2018 15:00 |
| GW-7E16-2-100418-(20)  | 18J0149-19    | Water  | 04-Oct-2018 16:15 | 05-Oct-2018 15:00 |
| GW-EB-EB-100518-(20)   | 18J0149-20    | Water  | 05-Oct-2018 10:00 | 05-Oct-2018 15:00 |
| GW-5C12-1-100518-(20)  | 18J0149-21    | Water  | 05-Oct-2018 11:00 | 05-Oct-2018 15:00 |
| GW-5C13-1-100518-(20)  | 18J0149-22    | Water  | 05-Oct-2018 10:00 | 05-Oct-2018 15:00 |
| GW-5D2-1R-100518-(20)  | 18J0149-23    | Water  | 05-Oct-2018 09:45 | 05-Oct-2018 15:00 |
| GW-5D2-1R-100518-(21)  | 18J0149-24    | Water  | 05-Oct-2018 09:50 | 05-Oct-2018 15:00 |
| GW-5C16-2R-100518-(20) | 18J0149-25    | Water  | 05-Oct-2018 12:00 | 05-Oct-2018 15:00 |
| GW-5C16-1R-100518-(20) | 18J0149-26    | Water  | 05-Oct-2018 12:30 | 05-Oct-2018 15:00 |
| GW-4C1-1-100518-(20)   | 18J0149-27    | Water  | 05-Oct-2018 13:45 | 05-Oct-2018 15:00 |
| GW-4D1-1-100518-(20)   | 18J0149-28    | Water  | 05-Oct-2018 14:15 | 05-Oct-2018 15:00 |
| GW-6E5-1-100518-(20)   | 18J0149-29    | Water  | 05-Oct-2018 14:20 | 05-Oct-2018 15:00 |
| GW-5E4-1-100518-(20)   | 18J0149-30    | Water  | 05-Oct-2018 12:30 | 05-Oct-2018 15:00 |
| GW-5D7-1R-100518-(20)  | 18J0149-31    | Water  | 05-Oct-2018 11:15 | 05-Oct-2018 15:00 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Oct-2018 15:25

## Work Order Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 5, 2018 under ARI work order 18J0149. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Dissolved Arsenic - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank BGJ0543 has Arsenic detected below the reporting limit, but above the method detection limit. The Arsenic has been flagged with a "J" qualifier on this method blank. There were no results detected above the reporting limits in the method blanks. No further corrective action was taken.

The LCS percent recoveries were within control limits.

Matrix spikes and duplicates were prepared in conjunction with samples GW-EB-EB-100518-(20) and GW-5D7-1R-10052018-(20). The matrix spike percent recoveries and duplicate RPD were within QC limits.



WORK ORDER

18J0149

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gaps 2018 Project Number: Port of Tacoma Arkema- Metals Testing

Preservation Confirmation

| Container ID | Container Type                 | pH      |
|--------------|--------------------------------|---------|
| 18J0149-01 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) | pass LZ |
| 18J0149-02 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-03 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-04 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-05 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-06 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-07 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-08 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-09 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-10 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-11 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-12 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-13 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-14 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-15 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-16 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-17 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-18 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-19 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-20 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-21 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-22 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-23 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-24 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-25 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-26 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-27 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-28 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-29 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-30 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |
| 18J0149-31 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |

Preservation Confirmed By JVB

Date 10/6/18

Reviewed By \_\_\_\_\_ Date \_\_\_\_\_





# Cooler Receipt Form

ARI Client: Pioneer Technologies

Project Name: \_\_\_\_\_

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 18J0149

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? YES  NO

Were custody papers properly filled out (ink, signed, etc.) YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 0.8°C

Time: 1500

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D005206

Cooler Accepted by: JTB Date: 10/5/18 Time: 1500

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? NA  YES  NO

Were all bottles sealed in individual plastic bags? YES  NO

Did all bottles arrive in good condition (unbroken)? YES  NO

Were all bottle labels complete and legible? YES  NO

Did the number of containers listed on COC match with the number of containers received? YES  NO

Did all bottle labels and tags agree with custody papers? JTB YES  NO

Were all bottles used correct for the requested analyses? YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO

Were all VOC vials free of air bubbles? NA  YES  NO

Was sufficient amount of sample sent in each bottle? YES  NO

Date VOC Trip Blank was made at ARI: \_\_\_\_\_

Was Sample Split by ARI:  NA YES  Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: JTB Date: 10/6/18 Time: 1233

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle  | Sample ID on COC             | Sample ID on Bottle                    | Sample ID on COC   |
|--|------------------------------|--|--|
| <u>GW-8G-2-10022018-(20)</u>                               | <u>GW-8G-2-1-100218-(20)</u> |  |  |
| <u>GW-7E2-1-10032018-(20)</u>                              | <u>GW-7E2-1-100318-(20)</u>  |  |  |
| <u>GW-7E9-2-10032018-(20)</u>                              | <u>GW-7E9-2-100318-(20)</u>  |  |  |
| <u>GW-7E8-1-10032018-(20)</u>                              | <u>GW-7E8-1-100318-(20)</u>  |  |  |
| <b>Additional Notes, Discrepancies, &amp; Resolutions:</b> |                              |  |  |
| <u>GW-6E12-2-10032018-(20)</u>                             |                              | <u>GW-6E12-2-100318-(20)</u>           |  |
| <u>GW-7F4-1-10052018-(20)</u>                              |                              | <u>GW-7F4-1-100518-(20)</u>            |  |
| <u>GW-6E9-2-10042018-(20)</u>                              |                              | <u>GW-6E9-2-100418-(20)</u>            |  |
| By: <u>JTB</u> Date: <u>10/6/18</u>                        |                              |  |  |
| <p>Small Air Bubbles<br/>~ 2mm</p>                         | <p>Peabubbles<br/>2-4 mm</p> | <p>LARGE Air Bubbles<br/>&gt; 4 mm</p> | <p>Small → "sm" (&lt; 2 mm)</p> <p>Peabubbles → "pb" (2 to &lt; 4 mm)</p> <p>Large → "lg" (4 to &lt; 6 mm)</p> <p>Headspace → "hs" (&gt; 6 mm)</p> |

\* Sample ID is different from Col

Cont on back →



GW-6E6-1-10042018-(20) / GW-6E6-1-100418-(20)  
GW-7E3-1-10042018-(20) / GW-7E3-1-100418-(20)  
GW-6D14-1-10042018-(20) / GW-6D14-100418-(20)  
GW-6E1-1-10042018-(20) / GW-6E1-1-100418-(20)  
GW-6D25-1-10042018-(20) / GW-6D25-1-100418-(20)  
GW-6D25-2-10042018-(20) / GW-6D25-2-100418-(20)  
GW-5D2-1R-100518-(20) / GW-5D2-1R-10052018-(20)  
GW-5D2-1(R)-10052018-(21) / GW-5D2-1R-10052018-(21)  
GW-5C16-2R-10052018-(20) / GW-5C16-2R-10052018-(20)  
GW-5C16-1R-10052018-(20) / GW-5C16-1R-10052018-(20)  
GW-6E5-1-100518-(20) / GW-6E5-1-10052018-(20)  
GW-5E4-1-100518-(20) / GW-5E4-1-10052018-(20)  
GW-5D7-1R-100518-(20) / GW-5D7-1R-10052018-(20)



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-8G2-1-100218-(20)**  
**18J0149-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/02/2018 15:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | 475    | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Oct-2018 15:25

**GW-7E6-2-100318-(20)**  
**18J0149-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/03/2018 14:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>138</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-7E7-2-100318-(20)**  
**18J0149-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/03/2018 12:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | 59.7   | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-7E10-1-100318-(20)**  
**18J0149-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/03/2018 11:15

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>291</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-7F2-1-100318-(20)**  
**18J0149-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/03/2018 10:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>86.3</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-7F3-1-100318-(20)**  
**18J0149-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/03/2018 10:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>3340</b> | ug/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-7E9-2-100318-(20)**  
**18J0149-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/03/2018 12:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>59.6</b> | ug/L  | D     |





Pioneer Technologies Corporation  
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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Oct-2018 15:25

**GW-7E8-1-100318-(20)**  
**18J0149-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/03/2018 13:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3610</b> | ug/L  | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-6E12-2-100318-(20)**  
**18J0149-09 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/03/2018 14:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>7190</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-7F4-1-100518-(20)**  
**18J0149-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 09:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>192</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
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Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-6E9-2-100418-(20)**  
**18J0149-11 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/04/2018 11:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2610</b> | ug/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-6E6-1-100418-(20)**  
**18J0149-12 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/04/2018 12:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3640</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-7E3-1-100418-(20)**  
**18J0149-13 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/04/2018 10:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>9720</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-6D14-1-100418-(20)**  
**18J0149-14 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/04/2018 13:15

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 200      | 4.40            | 40.0            | <b>43600</b> | ug/L  | D     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-6E1-1-100418-(20)**  
**18J0149-15 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/04/2018 14:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 200      | 4.40            | 40.0            | <b>43500</b> | ug/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-6D25-1-100418-(20)**  
**18J0149-16 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/04/2018 15:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>7170</b> | ug/L  | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-6D25-2-100418-(20)**  
**18J0149-17 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/04/2018 15:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1380</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-5C21-2-100418-(20)**  
**18J0149-18 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/04/2018 16:10  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>2080</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-7E16-2-100418-(20)**  
**18J0149-19 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/04/2018 16:15

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>3640</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-EB-EB-100518-(20)**  
**18J0149-20 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 10:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0542 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 5        | 0.110           | 1.00            | ND     | ug/L  | U     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-5C12-1-100518-(20)**  
**18J0149-21 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/05/2018 11:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/18/2018

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Preparation Batch: BGJ0543

Sample Size: 25 mL

Prepared: 17-Oct-2018

Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1380</b> | ug/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-5C13-1-100518-(20)**  
**18J0149-22 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/05/2018 10:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1340</b> | ug/L  | D     |



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Reported:  
22-Oct-2018 15:25

**GW-5D2-1R-100518-(20)**  
**18J0149-23 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 09:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1020</b> | ug/L  | D     |





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Reported:  
22-Oct-2018 15:25

**GW-5D2-1R-100518-(21)**  
**18J0149-24 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/05/2018 09:50

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>4610</b> | ug/L  | D     |



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Project Manager: Troy Bussey Jr.

Reported:  
22-Oct-2018 15:25

**GW-5C16-2R-100518-(20)**  
**18J0149-25 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 12:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>704</b> | ug/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-5C16-1R-100518-(20)**  
**18J0149-26 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 12:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>1190</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-4C1-1-100518-(20)**  
**18J0149-27 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 13:45  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>163</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-4D1-1-100518-(20)**  
**18J0149-28 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 14:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>4000</b> | ug/L  | D     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-6E5-1-100518-(20)**  
**18J0149-29 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/05/2018 14:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 200      | 4.40            | 40.0            | <b>29800</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Oct-2018 15:25

**GW-5E4-1-100518-(20)**  
**18J0149-30 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 12:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 1000     | 22.0            | 200             | <b>143000</b> | ug/L  | D     |



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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**GW-5D7-1R-100518-(20)**  
**18J0149-31 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/05/2018 11:15  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/19/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 500      | 11.0            | 100             | <b>86100</b> | ug/L  | D     |





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Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Oct-2018 15:25

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BGJ0542 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: MCB

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0542-BLK1)</b>       |         |        |                 |                 |       | Prepared: 17-Oct-2018 Analyzed: 17-Oct-2018 19:01                    |               |      |             |     |           |       |
| Arsenic, Dissolved                | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |     |           | U     |
| <b>LCS (BGJ0542-BS1)</b>          |         |        |                 |                 |       | Prepared: 17-Oct-2018 Analyzed: 17-Oct-2018 19:06                    |               |      |             |     |           |       |
| Arsenic, Dissolved                | 75a     | 24.4   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 97.4 | 80-120      |     |           |       |
| <b>Duplicate (BGJ0542-DUP1)</b>   |         |        |                 |                 |       | Source: 18J0149-20 Prepared: 17-Oct-2018 Analyzed: 19-Oct-2018 00:27 |               |      |             |     |           |       |
| Arsenic, Dissolved                | 75a     | ND     | 0.110           | 1.00            | ug/L  |  | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BGJ0542-MS1)</b> |         |        |                 |                 |       | Source: 18J0149-20 Prepared: 17-Oct-2018 Analyzed: 19-Oct-2018 00:32 |               |      |             |     |           |       |
| Arsenic, Dissolved                | 75a     | 25.6   | 0.110           | 1.00            | ug/L  | 25.0   | ND            | 102  | 75-125      |     |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
22-Oct-2018 15:25

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BGJ0543 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: MCB

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BGJ0543-BLK1)</b>       |         |        |                 |                 |       | Prepared: 17-Oct-2018 Analyzed: 17-Oct-2018 19:11                    |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | 0.0680 | 0.0220          | 0.200           | ug/L  |  |               |      |             |      |           | J     |
| <b>LCS (BGJ0543-BS1)</b>          |         |        |                 |                 |       | Prepared: 17-Oct-2018 Analyzed: 17-Oct-2018 19:16                    |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | 25.4   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 102  | 80-120      |      |           |       |
| <b>Duplicate (BGJ0543-DUP1)</b>   |         |        |                 |                 |       | Source: 18J0149-31 Prepared: 17-Oct-2018 Analyzed: 19-Oct-2018 00:11 |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | 81900  | 11.0            | 100             | ug/L  |  | 86100         |      |             | 5.04 | 20        | D     |
| <b>Matrix Spike (BGJ0543-MS1)</b> |         |        |                 |                 |       | Source: 18J0149-31 Prepared: 17-Oct-2018 Analyzed: 19-Oct-2018 00:16 |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | 77400  | 11.0            | 100             | ug/L  | 25.0   | 86100         | NR   | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gaps 2018

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

**Certified Analyses included in this Report**

| Analyte                           | Certifications            |
|-----------------------------------|---------------------------|
| <b>EPA 6020A UCT-KED in Water</b> |                           |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC |

| Code     | Description  | Number       | Expires    |
|----------|--|--------------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | 17-015       | 02/07/2019 |
| CALAP    | California Department of Public Health CAELAP      | 2748         | 06/30/2019 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169        | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006-011 | 05/12/2019 |
| WADOE    | WA Dept of Ecology                                 | C558         | 06/30/2019 |
| WA-DW    | Ecology - Drinking Water                           | C558         | 06/30/2019 |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gaps 2018

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
22-Oct-2018 15:25

### Notes and Definitions

- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- J Estimated concentration value detected below the reporting limit.
- U This analyte is not detected above the applicable reporting or detection limit.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



30 October 2018

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
18J0293

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request

|   |   |   |
|---|---|---|
| ARI Assigned Number:<br><b>18J0293</b>                        | Turn-around Requested:<br><b>Normal</b> | Date:<br><b>10/16/18</b>                                  |
| ARI Client Company:<br><b>Pioneer Technologies</b>            | Phone:<br><b>360-570-1700</b>           | Page:<br><b>1</b> of <b>2</b>                             |
| Client Contact:<br><b>Troy Bussey (busseyt@uspioneer.com)</b> |   | No. of Coolers:<br><b>1</b> Cooler Temps:<br><b>6.6°C</b> |



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

| Client Project Name:<br><b>Arkema FS DG Inv</b> |          |  |        |                | Analysis Requested                    |   |                     |                                 |  |  |  |  |  |  | Notes/Comments |  |  |  |  |
|---|----------|--|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|--|--|--|--|----------------|--|--|--|--|
| Client Project #:<br><b>79227</b>               |          | Samplers:<br><b>DG Cooper 206-660-3466</b> |        |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |  |  |  |  |                |  |  |  |  |
| Sample ID                                       | Date     | Time                                       | Matrix | No. Containers |                                       |   |                     |                                 |  |  |  |  |  |  |                |  |  |  |  |
| GW-5D1-3-101218-(20)                            | 10/12/18 | 1150                                       | W      | 1-500mL        |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| GW-8F1-1R-101518-(20)                           | 10/15/18 | 1000                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| GW-5D5-1-101518-(20)                            | 10/15/18 | 1330                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| GW-5E1-1-101518-(20)                            | 10/15/18 | 1235                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| GW-5E8-1-101518-(20)                            | 10/15/18 | 1110                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| GW-5E2-1-101518-(20)                            | 10/15/18 | 1145                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| GW-5E2-1-101518-(21)                            | 10/15/18 | 1150                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| EB-EB-101518-(20)                               | 10/15/18 | 1400                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| GW-6E7-3-101518-(20)                            | 10/15/18 | 1400                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |
| GW-6E2-1-101618-(20)                            | 10/16/18 | 0930                                       |        |                |                                       |   |                     | ✓                               |  |  |  |  |  |  |                |  |  |  |  |

|   |   |   |                              |                          |
|---|---|---|------------------------------|--------------------------|
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format Bill to Port of Tacoma PO#79227 | Relinquished by: (Signature) <i>[Signature]</i> | Received by: (Signature) <i>[Signature]</i> | Relinquished by: (Signature) | Received by: (Signature) |
|   | Printed Name: <b>A. CERRUTI</b>                 | Printed Name: <b>Jacob Walter</b>           | Printed Name:                | Printed Name:            |
|   | Company: <b>DOF</b>                             | Company: <b>ARI</b>                         | Company:                     | Company:                 |
|   | Date & Time: <b>10/16/18 1330</b>               | Date & Time: <b>10/16/18 1330</b>           | Date & Time:                 | Date & Time:             |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: \_\_\_\_\_ Turn-around Requested: **Normal**

ARI Client Company: **Pioneer Technologies** Phone: **360-570-1700**

Client Contact: **Troy Bussey (busseyt@uspioneer.com)**

Client Project Name: **Arkema FS DG Inv**

Client Project #: **79227** Samplers: **DG Cooper 206-660-3466**

Date: **10/16/18**

Page: **2** of **2**

No. of Coolers: **1** Cooler Temps: **0.6°C**



**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

| Sample ID              | Date     | Time | Matrix | No. Containers | Analysis Requested                    |   |                     |                                 |  |  | Notes/Comments |  |                          |
|------------------------|----------|------|--------|----------------|---------------------------------------|---|---------------------|---------------------------------|--|--|----------------|--|--------------------------|
|                        |          |      |        |                | Soil: Total Arsenic (EPA 3050B/6010C) | Soil: TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag (EPA 1311/6010C/7470A) | Soil: pH (EPA 9045) | Water: Dissolved As (EPA 6020A) |  |  |                |  |                          |
| GW-7E4-2-10/16/18-(20) | 10/16/18 | 0930 | W      | 1-500mL        |                                       |   |                     | ✓                               |  |  |                |  | FIELD FILTERED TO 0.45µm |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |
|                        |          |      |        |                |                                       |   |                     |                                 |  |  |                |  |                          |

|   |                                     |                                   |                        |                     |
|---|-------------------------------------|-----------------------------------|------------------------|---------------------|
| Comments/Special Instructions<br><br>Submit EDD to PIONEER using PIONEER EDD format<br>Bill to Port of Tacoma<br>PO#79227 | Relinquished by: <i>[Signature]</i> | Received by: <i>[Signature]</i>   | Relinquished by: _____ | Received by: _____  |
|   | Printed Name: <b>A. CERUOTI</b>     | Printed Name: <b>Jacob Walte</b>  | Printed Name: _____    | Printed Name: _____ |
|   | Company: <b>DOF</b>                 | Company: <b>ARI</b>               | Company: _____         | Company: _____      |
|   | Date & Time: <b>10/16/18 1330</b>   | Date & Time: <b>10/16/18 1330</b> | Date & Time: _____     | Date & Time: _____  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2018 13:02

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID             | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-----------------------|---------------|--------|-------------------|-------------------|
| GW-5D1-3-101218-(20)  | 18J0293-01    | Water  | 12-Oct-2018 11:50 | 16-Oct-2018 13:30 |
| GW-8F1-1R-101518-(20) | 18J0293-02    | Water  | 15-Oct-2018 10:00 | 16-Oct-2018 13:30 |
| GW-5D5-1-101518-(20)  | 18J0293-03    | Water  | 15-Oct-2018 13:30 | 16-Oct-2018 13:30 |
| GW-5E1-1-101518-(20)  | 18J0293-04    | Water  | 15-Oct-2018 12:35 | 16-Oct-2018 13:30 |
| GW-5E8-1-101518-(20)  | 18J0293-05    | Water  | 15-Oct-2018 11:10 | 16-Oct-2018 13:30 |
| GW-5E2-1-101518-(20)  | 18J0293-06    | Water  | 15-Oct-2018 11:45 | 16-Oct-2018 13:30 |
| GW-5E2-1-101518-(21)  | 18J0293-07    | Water  | 15-Oct-2018 11:50 | 16-Oct-2018 13:30 |
| EB-EB-101218-(20)     | 18J0293-08    | Water  | 15-Oct-2018 14:00 | 16-Oct-2018 13:30 |
| GW-6E7-3-101518-(20)  | 18J0293-09    | Water  | 15-Oct-2018 14:00 | 16-Oct-2018 13:30 |
| GW-6E2-1-101618-(20)  | 18J0293-10    | Water  | 16-Oct-2018 09:30 | 16-Oct-2018 13:30 |
| GW-7E4-2-101618-(20)  | 18J0293-11    | Water  | 16-Oct-2018 09:30 | 16-Oct-2018 13:30 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
30-Oct-2018 13:02

## Work Order Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 16, 2018 under ARI work order 18J0293. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Dissolved Arsenic - EPA Method 6020A

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank BGJ0543 has Arsenic detected below the reporting limit, but above the method detection limit. The Arsenic has been flagged with a "J" qualifier on the method blank. There were no detected results above the reporting limits in the method blanks. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample GW-5E8-1-101518-(20). The matrix spike has a natural concentration of Arsenic that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Arsenic has been flagged with an "HC" qualifier on the matrix spike. The results are advisory. The duplicate RPD was within QC limits. No further corrective action was taken.



WORK ORDER

18J0293

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |

**Report To:**  
Pioneer Technologies Corporation  
Troy Bussey Jr.  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503  
Phone: 360-570-1700  
Fax: -

**Invoice To:**  
Port of Tacoma  
Scott Hooten  
One Sitcum Plaza  
Tacoma, WA 98421  
Phone :(253) 383-9428  
Fax:

Date Due: 30-Oct-2018 18:00 (10 day TAT)

Received By: Jacob Walter

Date Received: 16-Oct-2018 13:30

Logged In By: Jasmine Bowman

Date Logged In: 16-Oct-2018 16:35

Samples Received at: 0.6°C

|   |  |
|---|--|
| Intact, properly signed and dated custody seals attached to outside of cooler(s).....No | Custody papers included with the cooler..... Yes         |
| Custody papers properly filled out (in, signed, analyses requested, etc).....Yes        | Was a temperature blank included in the cooler..... No   |
| Was sufficient ice used (if appropriate).....Yes  | All bottles sealed in individual plastic bags..... No    |
| All bottles arrived in good condition (unbroken).....Yes                                | All bottle labels complete and legible..... Yes          |
| Number of containers listed on COC match number received.....Yes                        | Bottle labels and tags agree with COC..... Yes           |
| Correct bottles used for the requested analyses.....Yes                                 | All VOC vials free of air bubbles..... No                |
| Analyses/bottles require preservation (attach preservation sheet excluding VOC)..Yes    | Sufficient amount of sample sent in each bottle..... Yes |
| Sample split at ARI.....No  |  |



WORK ORDER

18J0293

|   |   |
|---|---|
| <b>Client:</b> Pioneer Technologies Corporation                 | <b>Project Manager:</b> Amanda Volgardsen                         |
| <b>Project:</b> Port of Tacoma Arkema- FS Data Gap Investigatio | <b>Project Number:</b> Port of Tacoma Arkema- FS Data Gap Investi |

| Analysis  | Due        | TAT | Expires    | Comments       |
|---|------------|-----|------------|----------------|
| <b>18J0293-01 GW-5D1-3-101218-(20) [Water] Sampled 12-Oct-2018 11:50</b>  |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/10/2019  | field filtered |
| <b>18J0293-02 GW-8F1-1R-101518-(20) [Water] Sampled 15-Oct-2018 10:00</b> |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/13/2019  | field filtered |
| <b>18J0293-03 GW-5D5-1-101518-(20) [Water] Sampled 15-Oct-2018 13:30</b>  |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/13/2019  | field filtered |
| <b>18J0293-04 GW-5E1-1-101518-(20) [Water] Sampled 15-Oct-2018 12:35</b>  |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/13/2019  | field filtered |
| <b>18J0293-05 GW-5E8-1-101518-(20) [Water] Sampled 15-Oct-2018 11:10</b>  |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/13/2019  | field filtered |
| <b>18J0293-06 GW-5E2-1-101518-(20) [Water] Sampled 15-Oct-2018 11:45</b>  |            |     |            |                |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/13/2019  | field filtered |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| <b>18J0293-07 GW-5E2-1-101518-(21) [Water] Sampled 15-Oct-2018 11:50</b>  |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/13/2019  | field filtered |
| <b>18J0293-08 EB-EB-101218-(20) [Water] Sampled 15-Oct-2018 14:00</b>     |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/13/2019  | field filtered |
| <b>18J0293-09 GW-6E7-3-101518-(20) [Water] Sampled 15-Oct-2018 14:00</b>  |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/13/2019  | field filtered |
| <b>18J0293-10 GW-6E2-1-101618-(20) [Water] Sampled 16-Oct-2018 09:30</b>  |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/14/2019  | field filtered |
| <b>18J0293-11 GW-7E4-2-101618-(20) [Water] Sampled 16-Oct-2018 09:30</b>  |            |     |            |                |
| Filter 0.45 micron  | 10/30/2018 | 10  | 10/17/2018 | field filtered |
| Met Diss 6020A - As UCT   | 10/30/2018 | 10  | 4/14/2019  | field filtered |



WORK ORDER

18J0293

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type                 | pH      |   |
|--------------|--------------------------------|---------|---|
| 18J0293-01 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) | ~2 Pass |   |
| 18J0293-02 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) | ↓       |   |
| 18J0293-03 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |   |
| 18J0293-04 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |   |
| 18J0293-05 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |   |
| 18J0293-06 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |   |
| 18J0293-07 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |   |
| 18J0293-08 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |   |
| 18J0293-09 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |   |
| 18J0293-10 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         |   |
| 18J0293-11 A | HDPE NM, 500 mL, 1:1 HNO3 (FF) |         | ↓ |

JCB  
Preservation Confirmed By

10/16/18  
Date





# Cooler Receipt Form

ARI Client: Pioneer Technologies

Project Name: Arkema FS 06 Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 18J0293

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? .....  YES  NO

Were custody papers properly filled out (ink, signed, etc.) .....  YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 0.6°C

Time: 1330

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005206

Cooler Accepted by: SSW Date: 10/16/18 Time: 1330

**Complete custody forms and attach all shipping documents**

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? .....  YES  NO

Were all bottle labels complete and legible? .....  YES  NO

Did the number of containers listed on COC match with the number of containers received? .....  YES  NO

Did all bottle labels and tags agree with custody papers? .....  YES  NO

Were all bottles used correct for the requested analyses? .....  YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO

Were all VOC vials free of air bubbles? .....  NA  YES  NO

Was sufficient amount of sample sent in each bottle? .....  YES  NO

Date VOC Trip Blank was made at ARI: .....  NA  YES

Was Sample Split by ARI:  NA  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: SSW Date: 10/16/18 Time: 1635

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

Additional Notes, Discrepancies, & Resolutions: returned 43 metals bottles w/ HVO3

By: SSW Date: 10/16/18

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2018 13:02

**GW-5D1-3-101218-(20)**  
**18J0293-01 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/12/2018 11:50  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/18/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0543 Sample Size: 25 mL  
Prepared: 17-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 20       | 0.440           | 4.00            | <b>12.4</b> | ug/L  | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2018 13:02

**GW-8F1-1R-101518-(20)**  
**18J0293-02 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/15/2018 10:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>6.92</b> | ug/L  | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
30-Oct-2018 13:02

**GW-5D5-1-101518-(20)**  
**18J0293-03 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/15/2018 13:30  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 500      | 11.0            | 100             | <b>63200</b> | ug/L  | D     |





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**Reported:**  
30-Oct-2018 13:02

**GW-5E1-1-101518-(20)**  
**18J0293-04 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/15/2018 12:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>599</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2018 13:02

**GW-5E8-1-101518-(20)**  
**18J0293-05 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/15/2018 11:10

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>791</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2018 13:02

**GW-5E2-1-101518-(20)**  
**18J0293-06 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/15/2018 11:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>287</b> | ug/L  | D     |



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Reported:  
30-Oct-2018 13:02

**GW-5E2-1-101518-(21)**  
**18J0293-07 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/15/2018 11:50  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>294</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2018 13:02

**EB-EB-101218-(20)**  
**18J0293-08 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED Sampled: 10/15/2018 14:00  
Instrument: ICPMS2 Analyst: MCB Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 2        | 0.0440          | 0.400           | ND     | ug/L  | U     |



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**Reported:**  
30-Oct-2018 13:02

**GW-6E7-3-101518-(20)**  
**18J0293-09 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/15/2018 14:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>243</b> | ug/L  | D     |



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Reported:  
30-Oct-2018 13:02

**GW-6E2-1-101618-(20)**  
**18J0293-10 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/16/2018 09:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 50       | 1.10            | 10.0            | <b>11100</b> | ug/L  | D     |



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**Reported:**  
30-Oct-2018 13:02

**GW-7E4-2-101618-(20)**  
**18J0293-11 (Water)**

**Metals and Metallic Compounds (dissolved)**

Method: EPA 6020A UCT-KED

Sampled: 10/16/2018 09:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 10/26/2018

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix  
Preparation Batch: BGJ0673 Sample Size: 25 mL  
Prepared: 22-Oct-2018 Final Volume: 25 mL

| Analyte            | CAS Number | Dilution | Detection Limit | Reporting Limit | Result     | Units | Notes |
|--------------------|------------|----------|-----------------|-----------------|------------|-------|-------|
| Arsenic, Dissolved | 7440-38-2  | 10       | 0.220           | 2.00            | <b>151</b> | ug/L  | D     |





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**Reported:**  
30-Oct-2018 13:02

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BGJ0543 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: MCB

| QC Sample/Analyte           | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|---------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BGJ0543-BLK1)</b> |         |        |                 |                 |       | Prepared: 17-Oct-2018 Analyzed: 17-Oct-2018 19:11 |               |      |             |     |           |       |
| Arsenic, Dissolved          | 75a     | 0.0680 | 0.0220          | 0.200           | ug/L  |   |               |      |             |     |           | J     |
| <b>LCS (BGJ0543-BS1)</b>    |         |        |                 |                 |       | Prepared: 17-Oct-2018 Analyzed: 17-Oct-2018 19:16 |               |      |             |     |           |       |
| Arsenic, Dissolved          | 75a     | 25.4   | 0.0220          | 0.200           | ug/L  | 25.0  |               | 102  | 80-120      |     |           |       |



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Reported:  
30-Oct-2018 13:02

**Metals and Metallic Compounds (dissolved) - Quality Control**

**Batch BGJ0673 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix**

Instrument: ICPMS2 Analyst: MCB

| QC Sample/Analyte                 | Isotope | Result | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|---------|--------|-----------------|-----------------|-------|--|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BGJ0673-BLK1)</b>       |         |        |                 |                 |       | Prepared: 22-Oct-2018 Analyzed: 25-Oct-2018 18:38                    |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | ND     | 0.0220          | 0.200           | ug/L  |  |               |      |             |      |           | U     |
| <b>LCS (BGJ0673-BS1)</b>          |         |        |                 |                 |       | Prepared: 22-Oct-2018 Analyzed: 25-Oct-2018 18:43                    |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | 25.5   | 0.0220          | 0.200           | ug/L  | 25.0   |               | 102  | 80-120      |      |           |       |
| <b>Duplicate (BGJ0673-DUP1)</b>   |         |        |                 |                 |       | Source: 18J0293-05 Prepared: 22-Oct-2018 Analyzed: 26-Oct-2018 00:53 |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | 798    | 0.220           | 2.00            | ug/L  |  | 791           |      |             | 0.80 | 20        | D     |
| <b>Matrix Spike (BGJ0673-MS1)</b> |         |        |                 |                 |       | Source: 18J0293-05 Prepared: 22-Oct-2018 Analyzed: 26-Oct-2018 00:57 |               |      |             |      |           |       |
| Arsenic, Dissolved                | 75a     | 803    | 0.220           | 2.00            | ug/L  | 25.0   | 791           | 48.0 | 75-125      |      |           | HC, D |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Reported:  
30-Oct-2018 13:02

**Certified Analyses included in this Report**

| Analyte                           | Certifications                                     |              |            |
|-----------------------------------|--|--------------|------------|
| <b>EPA 6020A UCT-KED in Water</b> |  |              |            |
| Arsenic-75a                       | NELAP,WADOE,DoD-ELAP,ADEC                          |              |            |
| Code                              | Description  | Number       | Expires    |
| ADEC                              | Alaska Dept of Environmental Conservation          | 17-015       | 02/07/2019 |
| CALAP                             | California Department of Public Health CAELAP      | 2748         | 06/30/2019 |
| DoD-ELAP                          | DoD-Environmental Laboratory Accreditation Program | 66169        | 02/07/2019 |
| NELAP                             | ORELAP - Oregon Laboratory Accreditation Program   | WA100006-011 | 05/12/2019 |
| WADOE                             | WA Dept of Ecology                                 | C558         | 06/30/2019 |
| WA-DW                             | Ecology - Drinking Water                           | C558         | 06/30/2019 |

| Code     | Description  | Number       | Expires    |
|----------|--|--------------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | 17-015       | 02/07/2019 |
| CALAP    | California Department of Public Health CAELAP      | 2748         | 06/30/2019 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169        | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006-011 | 05/12/2019 |
| WADOE    | WA Dept of Ecology                                 | C558         | 06/30/2019 |
| WA-DW    | Ecology - Drinking Water                           | C558         | 06/30/2019 |



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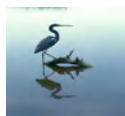
**Reported:**  
30-Oct-2018 13:02

### Notes and Definitions

- B This analyte was detected in the method blank.
- D The reported value is from a dilution
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- J Estimated concentration value detected below the reporting limit.
- U This analyte is not detected above the applicable reporting or detection limit.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.

**Data Gap #2D**  
**2017 Soil Samples (ARI)**

## QA/QC Solutions, LLC



James J. Mc Ateer, Jr., Managing Member  
7532 Champion Hill Rd. SE  
Salem, Oregon 97306  
Telephone: 503.763.6948  
Facsimile: 503.566.2114  
Cellular: 503.881.1501  
email: jjmcateer@msn.com

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November 20, 2017

Troy Bussey Jr., P.E.  
PIONEER Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, Washington 98503

Subject: Feasibility Study Data Gap Investigation, Former Arkema Manufacturing Site, Tacoma, WA;  
Soil Sample Data Validation Review Summary  
Client Project No.: Not Specified  
QA/QC Solutions, LLC Project No.: 092317.1

Dear Troy:

This letter documents the results of the data validation review of the conventional parameter and metal analyses completed on soil samples associated with Feasibility Study Data Gap Investigation completed at the Former Arkema Manufacturing Site located in Tacoma, Washington. Details of the investigation completed are provided in the FS Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. (Pioneer 2017).

The data reported were validated to verify the laboratory quality assurance and quality control (QA/QC) procedures were documented and that the overall quality of the data reported is sufficient to support its intended purposes. A summary of the data set, the analytical methods used to complete the chemical analyses, the data validation procedures used, and the overall assessment of data quality is presented below.

### Data Set

The data set consisted of 62 soil samples, two field duplicates, and one equipment rinsate blank that were submitted to the laboratory. Samples were collected during the month of September 2017. A summary of the samples collected and the analyses completed is presented in Table 1.

*\* Data users must note that only data considered reportable during data validation has been reported. In several instances, multiple reanalysis were completed.*

Analyses were completed by Analytical Resources, Inc. (ARI) located in Tukwila, Washington under the following six (6) work orders: 17I0138, 17I0167, 17I0187, 17I0208, 17I0247, and 17I0272. ARI submitted a electronic data deliverables (EDDs that included only a summary of sample and QC-related results and a data file summarizing the results of the data reported.

### Analytical Methods

The analytical methods that were used to complete the chemical analyses included the following:

- Total solids by desiccation and gravimetric determination using Standard Method SM 2540 G-97 (APHA 2012) and PSEP 1986 (for samples analyzed for sulfide).
- Total Aluminum, arsenic, iron, and manganese on soil samples by digestion and analysis by inductively coupled plasma-atomic emission spectrometry (ICP-AES) using on soil samples SW-846 methods 3050B and 6010C (SW-846 2017), respectively.
- Total arsenic by digestion and analysis by ICP-AES using SW-846 methods 3050B and 6010C (SW-846 2017), respectively.
- Total Aluminum, arsenic, iron, and manganese on the equipment rinsate blank by digestion and analysis by ICP-AES using SW-846 methods 3010A and 6010C (SW-846 2017), respectively.
- Toxicity characteristic leaching procedure (TCLP) metals (i.e., arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) on soil samples using SW-846 Method 1311 (U.S. EPA 2017) to generate a leachate (extraction fluid). The aqueous leachate was then acid digested using U.S. EPA SW-846 Method 3010A (U.S. EPA 2017), and analysis completed by ICP-AES using U.S. EPA SW-846 Method 6010C for most metals and Method 7470A for mercury (U.S. EPA 2017), respectively.
- Orthophosphorus and sulfate on soil samples and the equipment rinsate blank by ion chromatography using EPA Method 300.0 (U.S. EPA 1993).
- pH by electrochemical determination using SW-846 Method 9045D (U.S. EPA 2017) on soil samples and SW-846 Method 9040C (U.S. EPA 2017) on the equipment rinsate blank.
- Total carbon, total organic carbon, and total inorganic carbon on sediment samples by catalytic combustion using infrared detection using a modified version of SW-846 Method 9060A (U.S. EPA 2017) per the laboratory standard operating procedure; SW-846 Method 9060A was without modification for the analysis of the equipment rinsate blank.
- Total sulfide on soil samples and the equipment rinsate blank with sample preparation by distillation (Plumb 1981) and analysis by spectrophotometry using SM 4500-S2 D-00 (APHA 2012).

## Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results that were reported by the laboratory; this level of validation is also referred to as an abbreviated data review (equivalent to “Stage 2B” review per U.S. EPA 2009, which is equivalent to “Level EPA2B” for use with the Washington Department of Ecology EIMS database). The analytical data were validated generally following the applicable guidance and requirements:

- *Guidance on Environmental Data Verification and Validation* (U.S. EPA 2002)
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).

- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review*. Final. OSWER 9240.1-51. EPA 540-R-10-011 (U.S. EPA 2010).
- Method-specific and laboratory-established quality control requirements, as applicable.

Data validation procedures were modified to accommodate QA/QC requirements for methods (e.g., conventional parameters) that are not specifically addressed by the USEPA functional guidelines. In this situation, method-specific and laboratory-established control limits were used, as necessary, to determine if qualification of the data was necessary. The laboratory data deliverables that were validated, if present, included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Results for applicable method blanks and field blanks to determine whether an analyte that was reported as detected in any sample was the result of possible contamination introduced at the laboratory or during field sampling, respectively.
- Results for applicable standard reference material (SRM), laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, matrix spike (MS), and/or matrix spike duplicate (MSD) recoveries to assess analytical accuracy.
- Results for applicable laboratory duplicate sample, duplicate LCS, and/or MSD analyses to assess analytical precision.
- Results for the field duplicate samples to provide additional information in support of the quality assurance review.
- Laboratory summaries of analytical results.

Verification applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed during data validation effort per the requirements specified in the work plan (Pioneer 2017). All data subjected to the abbreviated data validation review completed may have analytical problems that can only be identified by completing a 100-percent review of all original instrument printouts and associated analytical quality control results. Verification of all possible factors that could result in the degradation of data quality cannot be made nor should be inferred based on the results of an abbreviated validation effort. The adequacy of the sampling procedures will not be completed during data validation. *QA/QC Solutions, LLC* will not be responsible for any qualitative and quantitative errors that may be reported by the laboratory.

Performance based control limits established by the laboratory and control limits provided in the method protocols will be used to evaluate data quality and determine the need for data qualification. Applicable laboratory control limits for surrogate compound recoveries, LCSs and LCS duplicate recoveries, and MS/MSD recoveries will be used during data validation. Data qualifiers will be assigned during data validation to the EDD when applicable QA/QC limits are not met and qualification of the data is warranted. Data qualifiers will be assigned following guidance specified by U.S. EPA (2002, 2009, and 2010) and using professional judgment.



## Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratory during the analysis of the samples were generally acceptable. Selected sample results required qualification during data validation because method-specific QA/QC criteria were not met; results maybe qualified for more than one reason. During data validation, the following actions were taken:

- A total of 127 results reported as detected were qualified as estimated (assigned a *J* qualifier).
- A total of 16 results reported as undetected (*U*) were qualified as undetected and estimated (assigned a *UJ* qualifier).
- A total of 13 results reported as detected were restated as undetected (assigned a *U* qualifier).
- No results required rejection (*R*).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J* or *UJ*) by the laboratory or during data validation. These qualified data usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data). Analytical data that were reported as undetected (*U*) by the laboratory or that were restated as undetected (*U*) during data validation are usable. A summary of the qualified sample data and the reason(s) for qualification is presented in Table 2; results may be qualified for more than one reason).

In some instances, selected samples required dilution prior to analysis (as is required by the analytical methods) to obtain concentrations that were within the linear range of the instrument or to minimize the effects of matrix interferences to obtain reportable results.

This concludes the data validation review summary. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at [jjmcaateer@msn.com](mailto:jjmcaateer@msn.com).

Cordially,



*QA/QC Solutions, LLC*

James J. Mc Ateer, Jr., Managing Member

Attachments

## **References**

APHA. 2012. Standard methods for the analysis of water and wastewater. 22<sup>nd</sup> ed. American Public Health Association, American Water Works Association, Water Environment Federation, Washington, DC.

Pioneer 2017. FS Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. February 2017. Prepared for Port of Tacoma. Prepared by Pioneer Technologies Corporation.

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Plumb, R.H., Jr. 1981. Procedures for handling and chemical analyses of sediment and water samples. Technical Report EPA/CE-81-1. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

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U.S. EPA 2010. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OSWER 9240.1-51. EPA 540-R-10-011. January 2010. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC.

U.S. EPA 2017. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. <https://www.epa.gov/hw-sw846/sw-846-compendium> (last updated on February 22, 2017). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC

Table 1. Summary of Samples Collected and Analyses Completed

| Sample Number                    | Laboratory Sample Number | Sample Date | Total Solids by SM 2540 G-97 | Total Aluminum, Arsenic, Iron, and Manganese by SW-846 3050B and 6010C | Total Arsenic by SW-846 3050B and 6010C | TCLP Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, and Silver by SW-846 1311 and 6010C | TCLP Mercury SW-846 1311 and 7470A | Orthophosphorus and Sulfate by EPA 300.0 | pH by SW-846 9045D | Total Organic Carbon by Plumb | Total Inorganic Carbon by SW-846 9060A (mod) | Total Carbon by calculation | Total Solids, Sulfide by PSEP 1986 | Total Sulfide by SM 4500-S2 D-00 |
|----------------------------------|--------------------------|-------------|------------------------------|--|---|--|------------------------------------|--|--------------------|-------------------------------|--|-----------------------------|------------------------------------|----------------------------------|
| <b>Work Order 1710138</b>        |                          |             |                              |  |   |  |                                    |  |                    |                               |  |                             |                                    |                                  |
| SO-PTC-002-091317-2.0-4.0        | 1710138-01               | 09/13/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-002-091317-13.0-15.0      | 1710138-02               | 09/13/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-002-091317-23.0-25.0      | 1710138-03               | 09/13/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-002-091317-31.0-33.0      | 1710138-04               | 09/13/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-208-091317-12.0-14.0      | 1710138-05               | 09/13/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-208-091317-12.0-14.0-(10) | 1710138-06               | 09/13/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-208-091317-16.0-18.0      | 1710138-07               | 09/13/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-208-091317-16.0-18.0-(10) | 1710138-08               | 09/13/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-208-091317-23.0-25.0      | 1710138-09               | 09/13/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-208-091317-33.0-35.0      | 1710138-10               | 09/13/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| <b>Work Order 1710167</b>        |                          |             |                              |  |   |  |                                    |  |                    |                               |  |                             |                                    |                                  |
| SO-PTC-101-091417-8.2-10.2       | 1710167-01               | 09/14/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-101-091417-8.2-10.2-(10)  | 1710167-02               | 09/14/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-101-091417-13.0-15.0      | 1710167-03               | 09/14/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-101-091417-13.0-15.0-(10) | 1710167-04               | 09/14/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-101-091417-19.3-20.3      | 1710167-05               | 09/14/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-101-091417-36.0-38.0      | 1710167-06               | 09/14/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| <b>Work Order 1710187</b>        |                          |             |                              |  |   |  |                                    |  |                    |                               |  |                             |                                    |                                  |
| SO-PTC-001-091517-2.5-4.5        | 1710187-01               | 09/15/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-001-091517-11.5-13.5      | 1710187-02               | 09/15/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-001-091517-23.0-25.0      | 1710187-03               | 09/15/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-001-091517-31.5-33.5      | 1710187-04               | 09/15/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-207-091517-10.0-12.0      | 1710187-05               | 09/15/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-207-091517-10.0-12.0-(10) | 1710187-06               | 09/15/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-207-091517-16.5-17.5      | 1710187-07               | 09/15/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-207-091517-16.5-17.5-(10) | 1710187-08               | 09/15/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-207-091517-28.0-30.0      | 1710187-09               | 09/15/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |
| SO-PTC-207-091517-37.5-39.0      | 1710187-10               | 09/15/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓                  | -                             | -  | -                           | -                                  | -                                |
| SO-PTC-207-091517-28.0-30.0-(01) | 1710187-11               | 09/15/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓                  | ✓                             | ✓  | ✓                           | ✓                                  | ✓                                |

Table 1, continued

| Sample Number                     | Laboratory Sample Number | Sample Date | Total Solids by SM 2540 G-97 | Total Aluminum, Arsenic, Iron, and Manganese by SW-846 3050B and 6010C | Total Arsenic by SW-846 3050B and 6010C | TCLP Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, and Silver by SW-846 1311 and 6010C | TCLP Mercury SW-846 1311 and 7470A | Orthophosphorus and Sulfate by EPA 300.0 | pH by EPA 9045D | Total Organic Carbon by Plumb | Total Inorganic Carbon by EPA 9060A (mod) | Total Carbon by calculation | Total Solids, Sulfide by PSEP 1986 | Total Sulfide by SM 4500-S2 D-00 |
|-----------------------------------|--------------------------|-------------|------------------------------|--|---|--|------------------------------------|--|-----------------|-------------------------------|---|-----------------------------|------------------------------------|----------------------------------|
| <b>Work Order 1710208</b>         |                          |             |                              |  |   |  |                                    |  |                 |                               |   |                             |                                    |                                  |
| SO-PTC-121-091817-11.0-13.0       | 1710208-01               | 09/18/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-121-091817-11.0-13.0-(10)  | 1710208-02               | 09/18/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-121-091817-13.1-15.0       | 1710208-03               | 09/18/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-121-091817-13.1-15.0-(10)  | 1710208-04               | 09/18/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-121-091817-22.0-24.0       | 1710208-05               | 09/18/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-121-091817-36.0-38.0       | 1710208-06               | 09/18/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-111-091817-6.0-8.0         | 1710208-07               | 09/18/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-111-091817-6.0-8.0-(10)    | 1710208-08               | 09/18/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-111-091817-13.1-15.0       | 1710208-09               | 09/18/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-111-091817-13.1-15.0-(10)  | 1710208-10               | 09/18/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-111-091817-20.0-22.0       | 1710208-11               | 09/18/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-111-091817-37.3-39.5       | 1710208-12               | 09/18/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| <b>Work Order 1710247</b>         |                          |             |                              |  |   |  |                                    |  |                 |                               |   |                             |                                    |                                  |
| SO-PTC-204-091917-10.8-12.8       | 1710247-01               | 09/19/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-204-101917-10.8-12.8-(10)  | 1710247-02               | 09/19/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-204-091917-12.8-14.8       | 1710247-03               | 09/19/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-204-091917-12.8-14.8-(10)  | 1710247-04               | 09/19/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-204-091917-23.0-25.0       | 1710247-05               | 09/19/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-204-091917-33.3-34.3       | 1710247-06               | 09/19/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-205-091917-8.0-10.0        | 1710247-07               | 09/19/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-205-101917-8.0-10.0(10)    | 1710247-08               | 09/19/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-205-091917-10.5-12.4       | 1710247-09               | 09/19/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-205-101917-10.5-12.4- (10) | 1710247-10               | 09/19/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-205-091917-20.0-22.0       | 1710247-11               | 09/19/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-205-091917-36.0-37.2       | 1710247-12               | 09/19/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| <b>Work Order 1710272</b>         |                          |             |                              |  |   |  |                                    |  |                 |                               |   |                             |                                    |                                  |
| SO-PTC-113-092017-7.5-10.0        | 1710272-01               | 09/20/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-113-092017-7.5-10.0-(10)   | 1710272-02               | 09/20/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-113-092017-12.3-14.3       | 1710272-03               | 09/20/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-113-092017-12.3-14.3-(10)  | 1710272-04               | 09/20/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-113-092017-18.0-20.0       | 1710272-05               | 09/20/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |

Table 1, continued

| Sample Number                    | Laboratory Sample Number | Sample Date | Total Solids by SM 2540 G-97 | Total Aluminum, Arsenic, Iron, and Manganese by SW-846 3050B and 6010C | Total Arsenic by SW-846 3050B and 6010C | TCLP Arsenic, Barium, Cadmium, Chromium, Lead, Selenium, and Silver by SW-846 1311 and 6010C | TCLP Mercury SW-846 1311 and 7470A | Orthophosphorus and Sulfate by EPA 300.0 | pH by EPA 9045D | Total Organic Carbon by Plumb | Total Inorganic Carbon by EPA 9060A (mod) | Total Carbon by calculation | Total Solids, Sulfide by PSEP 1986 | Total Sulfide by SM 4500-S2 D-00 |
|----------------------------------|--------------------------|-------------|------------------------------|--|---|--|------------------------------------|--|-----------------|-------------------------------|---|-----------------------------|------------------------------------|----------------------------------|
| SO-PTC-113-092017-37.0-39.0      | 1710272-06               | 09/20/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-113-092017-7.5-10.0-(01)  | 1710272-07               | 09/20/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-129-092017-10.0-12.0      | 1710272-08               | 09/20/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-129-092017-10.0-12.0-(10) | 1710272-09               | 09/20/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-129-092017-17.3-20.0      | 1710272-10               | 09/20/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-129-092017-17.3-20.0-(10) | 1710272-11               | 09/20/17    | -                            | -  | -                                       | ✓  | ✓                                  | -  | -               | -                             | -   | -                           | -                                  | -                                |
| SO-PTC-129-092017-22.5-25.0      | 1710272-12               | 09/20/17    | ✓                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | ✓                                  | ✓                                |
| SO-PTC-129-092017-35.8-36.5      | 1710272-13               | 09/20/17    | ✓                            | -  | ✓                                       | -  | -                                  | -  | ✓               | -                             | -   | -                           | -                                  | -                                |
| EB-EB-01-092017 (aqueous blank)* | 1710272-14               | 09/20/17    | -                            | ✓  | -                                       | -  | -                                  | ✓  | ✓               | ✓                             | ✓   | ✓                           | -                                  | ✓                                |
| <b>Total Number of Samples:</b>  |                          |             | 46                           | 25   | 22                                      | 18   | 18                                 | 25                                       | 47              | 25                            | 25  | 25                          | 24                                 | 25                               |

Notes

\*- see report for method reference since this is an aqueous sample

**Table 2. Summary of Qualified Data**

| Sample Number* | Laboratory Sample Number        | Chemical                           | Concentration | Units    | MDL  | RL   | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason  | Quality Control Result  | Possible Bias <sup>b,c,d</sup> |
|----------------|---------------------------------|------------------------------------|---------------|----------|------|------|----------------------|---------------------------|---|---|--------------------------------|
| 17I0272-14     | EB-EB-01-092017                 | pH                                 | 5.95          | pH Units | 0.01 | 0.01 | H                    | J                         | Method-required hold time constraint not met  | pH was not determined within 15 mins. of collection             | Low or high                    |
| 17I0138-01RE1  | SO-PTC-002-091317-2.0-4.0       | Orthophosphate                     | 1.43          | mg/kg    | 1.20 | 1.20 |                      | J                         | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 98.6  | Low or high                    |
| 17I0138-03RE1  | SO-PTC-002-091317-23.0-25.0     | Orthophosphate                     | 5.45          | mg/kg    | 5.45 | 5.45 | U                    | UJ                        | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 98.6  |                                |
| 17I0138-05RE1  | SO-PTC-208-091317-12.0-14.0     | Orthophosphate                     | 11.7          | mg/kg    | 11.5 | 11.5 |                      | J                         | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 98.6  | Low or high                    |
| 17I0138-09RE1  | SO-PTC-208-091317-23.0-25.0     | Orthophosphate                     | 17.4          | mg/kg    | 12.5 | 12.5 | D                    | J                         | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 98.6  | Low or high                    |
| 17I0208-01     | SO-PTC-121-091817-11.0-13.0     | Orthophosphate                     | 7.63          | mg/kg    | 7.63 | 7.63 | U                    | UJ                        | Matrix spike recovery was below lower control limit of 75 percent   | Matrix spike recovery was 0 percent                             | Low                            |
| 17I0208-05     | SO-PTC-121-091817-22.0-24.0     | Orthophosphate                     | 6.14          | mg/kg    | 6.14 | 6.14 | U                    | UJ                        | Matrix spike recovery was below lower control limit of 75 percent   | Matrix spike recovery was 0 percent                             | Low                            |
| 17I0208-07     | SO-PTC-111-091817-6.0-8.0       | Orthophosphate                     | 5.72          | mg/kg    | 5.72 | 5.72 | U                    | UJ                        | Matrix spike recovery was below lower control limit of 75 percent   | Matrix spike recovery was 0 percent                             | Low                            |
| 17I0208-11     | SO-PTC-111-091817-20.0-22.0     | Orthophosphate                     | 5.99          | mg/kg    | 5.99 | 5.99 | U                    | UJ                        | Matrix spike recovery was below lower control limit of 75 percent   | Matrix spike recovery was 0 percent                             | Low                            |
| 17I0272-01     | SO-PTC-113-092017-7.5-10.0      | Sulfate                            | 38.8          | mg/kg    | 6.01 | 6.01 | D, B                 | J                         | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 117   | Low or high                    |
| 17I0272-05     | SO-PTC-113-092017-18.0-20.0     | Orthophosphate                     | 21.1          | mg/kg    | 12.5 | 12.5 | D                    | J                         | Matrix spike recovery was below lower control limit of 75 percent   | Matrix spike recovery was 67.6 percent                          | Low                            |
| 17I0272-05RE1  |                                 | Sulfate                            | 338           | mg/kg    | 25.1 | 25.1 | D, B                 | J                         | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 117   | Low or high                    |
| 17I0272-07     | SO-PTC-113-092017-7.5-10.0-(01) | Sulfate                            | 34.8          | mg/kg    | 5.82 | 5.82 | D, B                 | J                         | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 117   | Low or high                    |
|                |                                 | Orthophosphate                     | 5.82          | mg/kg    | 5.82 | 5.82 | U                    | UJ                        | Matrix spike recovery was below lower control limit of 75 percent   | Matrix spike recovery was 67.6 percent                          | Low                            |
| 17I0272-08     | SO-PTC-129-092017-10.0-12.0     | Orthophosphate                     | 5.39          | mg/kg    | 5.39 | 5.39 | U                    | UJ                        | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 117   | Low or high                    |
| 17I0272-08RE1  |                                 | Sulfate                            | 358           | mg/kg    | 21.6 | 21.6 | D, B                 | J                         | Matrix spike recovery was below lower control limit of 75 percent   | Matrix spike recovery was 67.6 percent                          | Low                            |
| 17I0272-12     | SO-PTC-129-092017-22.5-25.0     | Orthophosphate                     | 5.74          | mg/kg    | 5.74 | 5.74 | U                    | UJ                        | Matrix spike recovery was below lower control limit of 75 percent   | Matrix spike recovery was 67.6 percent                          | Low                            |
| 17I0272-12RE1  |                                 | Sulfate                            | 158           | mg/kg    | 11.5 | 11.5 | D, B                 | J                         | RPD of laboratory duplicate analysis was above control limit of 20  | RPD = 117   | Low or high                    |
| 17I0138-01RE1  | SO-PTC-002-091317-2.0-4.0       | Total Carbon (Elemental + Organic) | 0.23          | percent  | NR   | NR   | B                    | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
| 17I0138-01RE1  |                                 | Inorganic Carbon                   | 0.231         | percent  | NR   | NR   |                      | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |

Table 2. Summary of Qualified Data, continued

| Sample Number* | Laboratory Sample Number    | Chemical                           | Concentration | Units   | MDL  | RL   | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason  | Quality Control Result  | Possible Bias <sup>b,c,d</sup> |
|----------------|-----------------------------|------------------------------------|---------------|---------|------|------|----------------------|---------------------------|---|---|--------------------------------|
| 17I0138-01RE4  |                             | Total Organic Carbon               | 0.09          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
| 17I0138-03     | SO-PTC-002-091317-23.0-25.0 | Total Organic Carbon               | 0.11          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
| 17I0138-03RE2  |                             | Total Carbon (Elemental + Organic) | 0.10          | percent | 0.02 | 0.02 | B                    | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
| 17I0138-03RE2  |                             | Inorganic Carbon                   | 0.0989        | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
| 17I0138-05     | SO-PTC-208-091317-12.0-14.0 | Total Carbon (Elemental + Organic) | 0.34          | percent | 0.02 | 0.02 | B                    | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
|                |                             | Total Organic Carbon               | 0.26          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
|                |                             | Inorganic Carbon                   | 0.0824        | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
| 17I0138-09     | SO-PTC-208-091317-23.0-25.0 | Total Carbon (Elemental + Organic) | 0.90          | percent | 0.02 | 0.02 | B                    | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
|                |                             | Total Organic Carbon               | 0.88          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
|                |                             | Inorganic Carbon                   | 0.0200        | percent | 0.02 | 0.02 | U                    | UJ                        | Total carbon RPD of laboratory duplicate analysis was above control limit of 20 and total carbon matrix spike recovery above upper control limit of 125 percent | Total carbon RPD = 28.6 and matrix spike recovery = 129 percent | Low or high                    |
| 17I0167-01     | SO-PTC-101-091417-8.2-10.2  | Total Carbon (Elemental + Organic) | 0.13          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)   | NA  | Indeterminate                  |
| 17I0167-01     |                             | Inorganic Carbon                   | 0.133         | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)   | NA  | Indeterminate                  |
| 17I0167-01RE2  |                             | Total Organic Carbon               | 0.14          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)   | NA  | Indeterminate                  |
| 17I0167-05     | SO-PTC-101-091417-19.3-20.3 | Total Carbon (Elemental + Organic) | 0.57          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)   | NA  | Indeterminate                  |
|                |                             | Total Organic Carbon               | 0.39          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)   | NA  | Indeterminate                  |
|                |                             | Inorganic Carbon                   | 0.180         | percent | 0.04 | 0.04 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)   | NA  | Indeterminate                  |
| 17I0187-01RE1  | SO-PTC-001-091517-2.5-4.5   | Total Carbon (Elemental + Organic) | 0.11          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20  | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4      | Low or high                    |
|                |                             | Inorganic Carbon                   | 0.0407        | percent | 0.04 | 0.04 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20  | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4      | Low or high                    |
|                |                             | Total Organic Carbon               | 0.06          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20  | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4      | Low or high                    |

**Table 2. Summary of Qualified Data, continued**

| Sample Number* | Laboratory Sample Number         | Chemical                           | Concentration | Units   | MDL  | RL   | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result                                     | Possible Bias <sup>b,c,d</sup> |
|----------------|----------------------------------|------------------------------------|---------------|---------|------|------|----------------------|---------------------------|--|--|--------------------------------|
| 17I0187-03     | SO-PTC-001-091517-23.0-25.0      | Total Organic Carbon               | 0.16          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
| 17I0187-03RE1  |                                  | Total Carbon (Elemental + Organic) | 0.23          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
| 17I0187-03RE1  |                                  | Inorganic Carbon                   | 0.230         | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
| 17I0187-05     | SO-PTC-207-091517-10.0-12.0      | Total Carbon (Elemental + Organic) | 0.33          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
|                |                                  | Total Organic Carbon               | 0.30          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
|                |                                  | Inorganic Carbon                   | 0.0400        | percent | 0.04 | 0.04 | U                    | UJ                        | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
| 17I0187-09     | SO-PTC-207-091517-28.0-30.0      | Total Carbon (Elemental + Organic) | 0.77          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
|                |                                  | Inorganic Carbon                   | 0.183         | percent | 0.04 | 0.04 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
|                |                                  | Total Organic Carbon               | 0.58          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
| 17I0187-11     | SO-PTC-207-091517-28.0-30.0-(01) | Total Organic Carbon               | 0.07          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
| 17I0187-11RE1  |                                  | Total Carbon (Elemental + Organic) | 0.20          | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
| 17I0187-11RE1  |                                  | Inorganic Carbon                   | 0.203         | percent | 0.02 | 0.02 |                      | J                         | Total carbon RPD for six (6) laboratory duplicate analysis was above control limit of 20 | Total carbon RPDs = 83.2, 81.6, 74.7, 87.9, 91.6, and 92.4 | Low or high                    |
| 17I0208-01     | SO-PTC-121-091817-11.0-13.0      | Total Carbon (Elemental + Organic) | 2.26          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
|                |                                  | Inorganic Carbon                   | 0.430         | percent | 0.04 | 0.04 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
|                |                                  | Total Organic Carbon               | 1.83          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
| 17I0208-05RE3  | SO-PTC-121-091817-22.0-24.0      | Total Carbon (Elemental + Organic) | 0.06          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
|                |                                  | Total Organic Carbon               | 0.05          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
|                |                                  | Inorganic Carbon                   | 0.0400        | percent | 0.04 | 0.04 | U                    | UJ                        | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
| 17I0208-07     | SO-PTC-111-091817-6.0-8.0        | Total Carbon (Elemental + Organic) | 0.06          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
|                |                                  | Total Organic Carbon               | 0.07          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
|                |                                  | Inorganic Carbon                   | 0.0400        | percent | 0.04 | 0.04 | U                    | UJ                        | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
| 17I0208-11     | SO-PTC-111-091817-20.0-22.0      | Total Carbon (Elemental + Organic) | 0.35          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
|                |                                  | Inorganic Carbon                   | 0.0459        | percent | 0.04 | 0.04 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |
|                |                                  | Total Organic Carbon               | 0.31          | percent | 0.02 | 0.02 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)                      | NA   | Indeterminate                  |



Table 2. Summary of Qualified Data, continued

| Sample Number* | Laboratory Sample Number        | Chemical                           | Concentration | Units   | MDL    | RL     | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result   | Possible Bias <sup>b,c,d</sup> |
|----------------|---------------------------------|------------------------------------|---------------|---------|--------|--------|----------------------|---------------------------|--|--|--------------------------------|
| 17I0247-01     | SO-PTC-204-091917-10.8-12.8     | Total Carbon (Elemental + Organic) | 0.29          | percent | 0.02   | 0.02   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
|                |                                 | Inorganic Carbon                   | 0.0754        | percent | 0.04   | 0.04   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
|                |                                 | Total Organic Carbon               | 0.21          | percent | 0.02   | 0.02   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
| 17I0247-05RE1  | SO-PTC-204-091917-23.0-25.0     | Total Carbon (Elemental + Organic) | 0.52          | percent | 0.02   | 0.02   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
|                |                                 | Total Organic Carbon               | 0.68          | percent | 0.02   | 0.02   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
|                |                                 | Inorganic Carbon                   | 0.0400        | percent | 0.04   | 0.04   | U                    | UJ                        | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
| 17I0247-07     | SO-PTC-205-091917-8.0-10.0      | Total Carbon (Elemental + Organic) | 0.32          | percent | 0.02   | 0.02   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
|                |                                 | Inorganic Carbon                   | 0.143         | percent | 0.0400 | 0.0400 |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
|                |                                 | Total Organic Carbon               | 0.17          | percent | 0.02   | 0.02   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
| 17I0247-11     | SO-PTC-205-091917-20.0-22.0     | Total Carbon (Elemental + Organic) | 0.35          | percent | 0.02   | 0.02   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
|                |                                 | Inorganic Carbon                   | 0.0505        | percent | 0.04   | 0.04   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
|                |                                 | Total Organic Carbon               | 0.30          | percent | 0.02   | 0.02   |                      | J                         | Limited QC data reported (only results for method blank and an SRM)  | NA   | Indeterminate                  |
| 17I0272-01     | SO-PTC-113-092017-7.5-10.0      | Total Carbon (Elemental + Organic) | 0.07          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                |                                 | Total Organic Carbon               | 0.08          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                |                                 | Inorganic Carbon                   | 0.0400        | percent | 0.04   | 0.04   | U                    | UJ                        | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
| 17I0272-05RE1  | SO-PTC-113-092017-18.0-20.0     | Total Carbon (Elemental + Organic) | 0.92          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                |                                 | Inorganic Carbon                   | 0.282         | percent | 0.04   | 0.04   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                |                                 | Total Organic Carbon               | 0.64          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
| 17I0272-07RE1  | SO-PTC-113-092017-7.5-10.0-(01) | Total Carbon (Elemental + Organic) | 0.06          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |

Table 2. Summary of Qualified Data, continued

| Sample Number*     | Laboratory Sample Number         | Chemical                           | Concentration | Units   | MDL    | RL     | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result   | Possible Bias <sup>b,c,d</sup> |
|--------------------|----------------------------------|------------------------------------|---------------|---------|--------|--------|----------------------|---------------------------|--|--|--------------------------------|
|                    |                                  | Total Organic Carbon               | 0.04          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                    |                                  | Inorganic Carbon                   | 0.0400        | percent | 0.04   | 0.04   | U                    | UJ                        | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
| 1710272-08RE1      | SO-PTC-129-092017-10.0-12.0      | Total Carbon (Elemental + Organic) | 0.10          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                    |                                  | Inorganic Carbon                   | 0.0481        | percent | 0.04   | 0.04   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                    |                                  | Total Organic Carbon               | 0.05          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
| 1710272-12         | SO-PTC-129-092017-22.5-25.0      | Total Carbon (Elemental + Organic) | 0.20          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                    |                                  | Total Organic Carbon               | 0.19          | percent | 0.02   | 0.02   |                      | J                         | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
|                    |                                  | Inorganic Carbon                   | 0.0400        | percent | 0.04   | 0.04   | U                    | UJ                        | Total carbon and total organic carbon RPDs in laboratory duplicate analysis were above control limit of 20 and total carbon and total organic carbon matrix spike recoveries were above upper control limit of 125 percent | Total carbon RPD = 30.5, total organic carbon RPD = 28.2, matrix spike recovery for total carbon = 135 percent, and matrix spike recovery for total organic carbon = 135 percent | Low or high                    |
| <b>Metals Data</b> |                                  |                                    |               |         |        |        |                      |                           |  |  |                                |
| 1710138-01         | SO-PTC-002-091317-2.0-4.0        | Arsenic, Inorganic                 | 1.57          | mg/kg   | 0.314  | 5.61   | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710138-02         | SO-PTC-002-091317-13.0-15.0      | Arsenic, Inorganic                 | 7.47          | mg/kg   | 0.609  | 10.9   | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710138-04         | SO-PTC-002-091317-31.0-33.0      | Arsenic, Inorganic                 | 5.45          | mg/kg   | 0.452  | 8.07   | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710138-05         | SO-PTC-208-091317-12.0-14.0      | Arsenic, Inorganic                 | 2.16          | mg/kg   | 0.342  | 6.11   | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710138-06         | SO-PTC-208-091317-12.0-14.0-(10) | Cadmium                            | 0.0012        | mg/L    | 0.0006 | 0.0100 | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
|                    |                                  | Chromium, Total                    | 0.0084        | mg/L    | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710138-08         | SO-PTC-208-091317-16.0-18.0-(10) | Barium                             | 0.0105        | mg/L    | 0.0075 | 0.0150 | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
|                    |                                  | Chromium, Total                    | 0.0024        | mg/L    | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710138-10         | SO-PTC-208-091317-33.0-35.0      | Arsenic, Inorganic                 | 3.84          | mg/kg   | 0.378  | 6.74   | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710167-02         | SO-PTC-101-091417-8.2-10.2-(10)  | Chromium, Total                    | 0.0076        | mg/L    | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710167-04         | SO-PTC-101-091417-13.0-15.0-(10) | Chromium, Total                    | 0.0141        | mg/L    | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710167-06         | SO-PTC-101-091417-36.0-38.0      | Arsenic, Inorganic                 | 5.47          | mg/kg   | 0.443  | 7.90   | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710187-01         | SO-PTC-001-091517-2.5-4.5        | Arsenic, Inorganic                 | 2.64          | mg/kg   | 0.334  | 5.96   | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |
| 1710187-02         | SO-PTC-001-091517-11.5-13.5      | Arsenic, Inorganic                 | 4.34          | mg/kg   | 0.396  | 7.07   | J                    | J                         | Concentration is >MDL, <RL   | NA   | Indeterminate                  |

**Table 2. Summary of Qualified Data, continued**

| Sample Number* | Laboratory Sample Number          | Chemical           | Concentration | Units | MDL    | RL     | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason                    | Quality Control Result           | Possible Bias <sup>b,c,d</sup> |
|----------------|-----------------------------------|--------------------|---------------|-------|--------|--------|----------------------|---------------------------|---|----------------------------------|--------------------------------|
| 17I0187-03     | SO-PTC-001-091517-23.0-25.0       | Arsenic, Inorganic | 0.375         | mg/kg | 0.346  | 6.17   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0187-04     | SO-PTC-001-091517-31.5-33.5       | Arsenic, Inorganic | 5.91          | mg/kg | 0.440  | 7.85   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0187-05     | SO-PTC-207-091517-10.0-12.0       | Arsenic, Inorganic | 2.75          | mg/kg | 0.339  | 6.06   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0187-07     | SO-PTC-207-091517-16.5-17.5       | Arsenic, Inorganic | 4.98          | mg/kg | 0.438  | 7.81   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0187-08     | SO-PTC-207-091517-16.5-17.5-(10)  | Arsenic, Inorganic | 0.0177        | mg/L  | 0.0140 | 0.250  | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Barium             | 0.0120        | mg/L  | 0.0075 | 0.0150 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Chromium, Total    | 0.0112        | mg/L  | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0187-09     | SO-PTC-207-091517-28.0-30.0       | Arsenic, Inorganic | 2.22          | mg/kg | 0.344  | 6.14   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0187-10     | SO-PTC-207-091517-37.5-39.0       | Arsenic, Inorganic | 1.85          | mg/kg | 0.395  | 7.04   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0187-11     | SO-PTC-207-091517-28.0-30.0-(01)  | Arsenic, Inorganic | 2.44          | mg/kg | 0.355  | 6.34   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0208-02     | SO-PTC-121-091817-11.0-13.0-(10)  | Chromium, Total    | 0.0079        | mg/L  | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0208-04     | SO-PTC-121-091817-13.1-15.0-(10)  | Chromium, Total    | 0.0055        | mg/L  | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0208-06     | SO-PTC-121-091817-36.0-38.0       | Arsenic, Inorganic | 4.09          | mg/kg | 0.394  | 7.03   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0208-08     | SO-PTC-111-091817-6.0-8.0-(10)    | Chromium, Total    | 0.0032        | mg/L  | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0208-10     | SO-PTC-111-091817-13.1-15.0-(10)  | Cadmium            | 0.0244        | mg/L  | 0.0025 | 0.0400 | J, D                 | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Chromium, Total    | 0.0238        | mg/L  | 0.0094 | 0.100  | J, D                 | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0208-12     | SO-PTC-111-091817-37.3-39.5       | Arsenic, Inorganic | 4.03          | mg/kg | 0.472  | 8.43   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0247-02     | SO-PTC-204-101917-10.8-12.8-(10)  | Chromium, Total    | 0.0122        | mg/L  | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0247-04     | SO-PTC-204-091917-12.8-14.8-(10)  | Chromium, Total    | 0.0215        | mg/L  | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0247-06     | SO-PTC-204-091917-33.3-34.3       | Arsenic, Inorganic | 2.51          | mg/kg | 0.378  | 6.75   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0247-08     | SO-PTC-205-101917-8.0-10.0(10)    | Arsenic, Inorganic | 0.174         | mg/L  | 0.0140 | 0.250  | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Barium             | 0.0099        | mg/L  | 0.0075 | 0.0150 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Chromium, Total    | 0.0109        | mg/L  | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0247-10     | SO-PTC-205-101917-10.5-12.4- (10) | Arsenic, Inorganic | 0.0505        | mg/L  | 0.0140 | 0.250  | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Barium             | 0.0099        | mg/L  | 0.0075 | 0.0150 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Chromium, Total    | 0.0103        | mg/L  | 0.0024 | 0.0250 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0247-11     | SO-PTC-205-091917-20.0-22.0       | Arsenic, Inorganic | 5.45          | mg/kg | 0.357  | 6.37   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0247-12     | SO-PTC-205-091917-36.0-37.2       | Arsenic, Inorganic | 6.62          | mg/kg | 0.433  | 7.73   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0272-02     | SO-PTC-113-092017-7.5-10.0-(10)   | Cadmium            | 0.0009        | mg/L  | 0.0006 | 0.0100 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0272-04     | SO-PTC-113-092017-12.3-14.3-(10)  | Barium             | 0.0122        | mg/L  | 0.0075 | 0.0150 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Lead and Compounds | 0.0079        | mg/L  | 0.0065 | 0.100  | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Chromium, Total    | 0.0111        | mg/L  | 0.0024 | 0.0250 | J                    | U                         | Mercury detect in associated method blank | Detected at 0.0055 mg/L in blank | False positive                 |
| 17I0272-06     | SO-PTC-113-092017-37.0-39.0       | Arsenic, Inorganic | 6.64          | mg/kg | 0.472  | 8.42   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0272-09     | SO-PTC-129-092017-10.0-12.0-(10)  | Arsenic, Inorganic | 0.204         | mg/L  | 0.0140 | 0.250  | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Barium             | 0.0103        | mg/L  | 0.0075 | 0.0150 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Cadmium            | 0.0008        | mg/L  | 0.0006 | 0.0100 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0272-11     | SO-PTC-129-092017-17.3-20.0-(10)  | Barium             | 0.0147        | mg/L  | 0.0075 | 0.0150 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
|                |                                   | Cadmium            | 0.0016        | mg/L  | 0.0006 | 0.0100 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0272-13     | SO-PTC-129-092017-35.8-36.5       | Arsenic, Inorganic | 6.79          | mg/kg | 0.477  | 8.51   | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |
| 17I0272-14     | EB-EB-01-092017                   | Iron               | 0.0051        | mg/L  | 0.0013 | 0.0500 | J                    | J                         | Concentration is >MDL, <RL                | NA                               | Indeterminate                  |

**Table 2. Summary of Qualified Data, continued**

| Sample Number*      | Laboratory Sample Number         | Chemical            | Concentration | Units | MDL      | RL       | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason                      | Quality Control Result   | Possible Bias <sup>b,c,d</sup> |
|---------------------|----------------------------------|---------------------|---------------|-------|----------|----------|----------------------|---------------------------|---|--|--------------------------------|
| <b>Mercury Data</b> |                                  |                     |               |       |          |          |                      |                           |   |  |                                |
| 17I0208-02          | SO-PTC-121-091817-11.0-13.0-(10) | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0208-04          | SO-PTC-121-091817-13.1-15.0-(10) | Mercury (elemental) | 0.000060      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0208-08          | SO-PTC-111-091817-6.0-8.0-(10)   | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0208-10          | SO-PTC-111-091817-13.1-15.0-(10) | Mercury (elemental) | 0.000080      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0247-02          | SO-PTC-204-101917-10.8-12.8-(10) | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0247-04          | SO-PTC-204-091917-12.8-14.8-(10) | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0247-08          | SO-PTC-205-101917-8.0-10.0(10)   | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0247-10          | SO-PTC-205-101917-10.5-12.4-(10) | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0272-02          | SO-PTC-113-092017-7.5-10.0-(10)  | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0272-04          | SO-PTC-113-092017-12.3-14.3-(10) | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0272-09          | SO-PTC-129-092017-10.0-12.0-(10) | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |
| 17I0272-11          | SO-PTC-129-092017-17.3-20.0-(10) | Mercury (elemental) | 0.000050      | mg/L  | 0.000007 | 0.000100 | J                    | U                         | Mercury detected in associated method blank | Detected at 0.000050 mg/L in method blank. Sample result restated undetected at this concentration | False positive                 |

**Notes:**

- B - analyte was detected in the method blank
- D - reported value is from a dilution
- H - holding time not met
- J - estimated
- MDL - method detection limit
- RL - reporting limit
- RPDs - relative percent differences
- SRM - standard reference material
- U - undetected at detection limit shown

|                                |     |
|--------------------------------|-----|
| Total results qualified "J" =  | 127 |
| Total results qualified "U" =  | 13  |
| Total results qualified "UJ" = | 16  |
| Total results qualified "R" =  | 0   |

\* Summary of qualified data is for natural and field quality control samples only

<sup>b</sup>Low bias - concentration reported is exhibits low bias and the actual reporting limit or concentration may be greater than reported

<sup>c</sup>High bias - result reported exhibits high bias and the actual reporting limit or concentration may be lower than reported

<sup>d</sup>False positive - compound is likely not present

\* Data users must note that only data considered reportable during data validation has been reported. In several instances, multiple reanalysis were completed.



06 October 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17I0138

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: **9/13/2017**  
 Page: **1** of **1**  
 No. of Coolers: **1**  
 Cooler Temps: \_\_\_\_\_

Turn-around Requested: **Normal**  
 Phone: **360-570-1700**  
 ARI Assigned Number: **1710138**  
 ARI Client Company: **Pioneer Technologies**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**

| Sample ID                       | Date   | Time  | Matrix | No. Containers  | Analysis Requested                |  |                      |                |                                       |  |                           |                             |                                   |  | Notes/Comments |  |  |  |
|---------------------------------|--|-------|--------|-----------------|-----------------------------------|--|----------------------|----------------|---------------------------------------|--|---------------------------|-----------------------------|-----------------------------------|--|----------------|--|--|--|
|                                 |  |       |        |                 | Total Arsenic<br>EPA 3050B/6010C  | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Ag | EPA 1311/6010C/7470A | pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 3050B/6010C         | Sulfate, Ortho-phosphorus<br>EPA 300.0 | TOC, TIC<br>EPA 9060A Mod | Sulfide<br>SM 4500-S2(PSEP) |                                   |  |                |  |  |  |
| SD-PTC-001-091317-20-40         | 9/13/17  | 8:30  | soil   | 1-16oz<br>1-2oz | X                                 |  |                      |                | X                                     | X                                      | X                         | X                           |                                   |  |                |  |  | S-STRUCK<br>I-INTOXICATED<br>A-ACQUIRED<br>AS-ACQUIRED |
| SD-PTC-002-091317-13-0-15.0     | 9/13/17  | 8:40  | SOIL   | 1-16oz          | X                                 |  |                      |                | X                                     |  |                           |                             |                                   |  |                |  |  | SA   |
| SD-PTC-002-091317-23-0-25.0     | 9/13/17  | 8:50  | SOIL   | 1-16oz<br>1-2oz | X                                 |  |                      |                | X                                     | X                                      | X                         | X                           |                                   |  |                |  |  | SAF  |
| SD-PTC-002-091317-310-35.0      | 9/13/17  | 9:20  | SOIL   | 1-16oz          | X                                 |  |                      |                | X                                     |  |                           |                             |                                   |  |                |  |  | IA   |
| SD-PTC-008-091317-12.0-14.0     | 9/13/17  | 13:50 | SOIL   | 1-16oz<br>1-2oz | X                                 |  |                      |                | X                                     | X                                      | X                         | X                           |                                   |  |                |  |  | IAF  |
| SD-PTC-008-091317-12.0-14.0-10  | 9/13/17  | 1350  | SOIL   | 1-4oz           | X                                 |  |                      |                |                                       |  |                           |                             |                                   |  |                |  |  | SA   |
| SD-PTC-008-091317-16.0-18.0     | 9/13/17  | 1400  | SOIL   | 1-16oz          | X                                 |  |                      |                |                                       |  |                           |                             |                                   |  |                |  |  | SAF-SA   |
| SD-PTC-008-091317-16.0-18.0(10) | 9/13/17  | 1400  | SOIL   | 1-4oz           |                                   |  |                      |                |                                       |  |                           |                             |                                   |  |                |  |  | SAF  |
| SD-PTC-008-091317-23.0-25.0     | 9/13/17  | 1420  | SOIL   | 1-16oz<br>1-2oz | X                                 |  |                      |                | X                                     | X                                      | X                         | X                           | X                                 |  |                |  |  | TA   |
| SD-PTC-008-091317-33.0-35.0     | 9/13/17  | 1430  | SOIL   | 1-16oz          | X                                 |  |                      |                | X                                     |  |                           |                             |                                   |  |                |  |  | IAF  |
| Comments/Special Instructions   | Relinquished by: <i>Paul Mork</i><br>(Signature) |       |        |                 | Received by: _____<br>(Signature) |  |                      |                | Relinquished by: _____<br>(Signature) |  |                           |                             | Received by: _____<br>(Signature) |  |                |  |  |  |
| Sulfides preserved w/ZnAc       | Printed Name: <i>Paul Mork</i>                   |       |        |                 | Printed Name: _____               |  |                      |                | Printed Name: _____                   |  |                           |                             | Printed Name: _____               |  |                |  |  |  |
| Submit EDD to PIONEER using     | Company: <i>ARI</i>                              |       |        |                 | Company: _____                    |  |                      |                | Company: _____                        |  |                           |                             | Company: _____                    |  |                |  |  |  |
| PIONEER EDD format              | Date & Time: <i>9/13/17 16:13</i>                |       |        |                 | Date & Time: _____                |  |                      |                | Date & Time: _____                    |  |                           |                             | Date & Time: _____                |  |                |  |  |  |
| Bill to Port of Tacoma          | Date & Time: <i>9/13/17 16:13</i>                |       |        |                 | Date & Time: _____                |  |                      |                | Date & Time: _____                    |  |                           |                             | Date & Time: _____                |  |                |  |  |  |
| PO#79227                        | Date & Time: <i>9/13/17 16:13</i>                |       |        |                 | Date & Time: _____                |  |                      |                | Date & Time: _____                    |  |                           |                             | Date & Time: _____                |  |                |  |  |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Cooler Receipt Form

ARI Client: DOF  
 COC No(s): \_\_\_\_\_ NA  
 Assigned ARI Job No: 17I0138

Project Name: \_\_\_\_\_  
 Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
 Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO   
 Were custody papers included with the cooler? ..... YES  NO   
 Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO   
 Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 4.6  
 Time: \_\_\_\_\_  
 If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005206  
 Cooler Accepted by: pm Date: 9/13/2017 Time: 16:13

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO   
 What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_  
 Was sufficient ice used (if appropriate)? ..... NA  YES  NO   
 Were all bottles sealed in individual plastic bags? ..... YES  NO   
 Did all bottles arrive in good condition (unbroken)? ..... YES  NO   
 Were all bottle labels complete and legible? ..... YES  NO   
 Did the number of containers listed on COC match with the number of containers received? ..... YES  NO   
 Did all bottle labels and tags agree with custody papers? ..... YES  NO   
 Were all bottles used correct for the requested analyses? ..... YES  NO   
 Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)...  NA YES NO  
 Were all VOC vials free of air bubbles? .....  NA YES NO  
 Was sufficient amount of sample sent in each bottle? ..... YES  NO   
 Date VOC Trip Blank was made at ARI.....  NA  
 Was Sample Split by ARI :  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_  
 Samples Logged by: pm Date: 9/13/2017 Time: 11:14

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

*Additional Notes, Discrepancies, & Resolutions:*

By: \_\_\_\_\_ Date: \_\_\_\_\_

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 10:29

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-002-091317-2.0-4.0        | 17I0138-01    | Solid  | 13-Sep-2017 08:30 | 14-Sep-2017 16:13 |
| SO-PTC-002-091317-13.0-15.0      | 17I0138-02    | Solid  | 13-Sep-2017 08:40 | 14-Sep-2017 16:13 |
| SO-PTC-002-091317-23.0-25.0      | 17I0138-03    | Solid  | 13-Sep-2017 08:50 | 14-Sep-2017 16:13 |
| SO-PTC-002-091317-31.0-33.0      | 17I0138-04    | Solid  | 13-Sep-2017 09:20 | 14-Sep-2017 16:13 |
| SO-PTC-208-091317-12.0-14.0      | 17I0138-05    | Solid  | 13-Sep-2017 13:50 | 14-Sep-2017 16:13 |
| SO-PTC-208-091317-12.0-14.0-(10) | 17I0138-06    | Solid  | 13-Sep-2017 13:50 | 14-Sep-2017 16:13 |
| SO-PTC-208-091317-16.0-18.0      | 17I0138-07    | Solid  | 13-Sep-2017 14:00 | 14-Sep-2017 16:13 |
| SO-PTC-208-091317-16.0-18.0-(10) | 17I0138-08    | Solid  | 13-Sep-2017 14:00 | 14-Sep-2017 16:13 |
| SO-PTC-208-091317-23.0-25.0      | 17I0138-09    | Solid  | 13-Sep-2017 14:20 | 14-Sep-2017 16:13 |
| SO-PTC-208-091317-33.0-35.0      | 17I0138-10    | Solid  | 13-Sep-2017 14:30 | 14-Sep-2017 16:13 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 10:29

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 14, 2017 under ARI workorder 1710138. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total and TCLP Metals - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0326 (total) has Aluminum and Iron detected below the reporting limits, but above the method detection limits. Method blank BFI0396 (TCLP) has Cadmium detected below the reporting limit, but above the method detection limit. These metals have been flagged with "J" qualifiers on their associated method blanks. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-002-091317-2.0-4.0. The duplicate has an Arsenic concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. The Arsenic has been flagged with an "L" qualifier on the duplicate. The matrix spike has natural concentrations of Aluminum and Iron that are so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. These metals have been flagged with an "HC" qualifier on the matrix spike. No further corrective action was taken.

### Anions - EPA 300.0

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0284-BLK2 has Sulfate detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-002-091317-2.0-4.0. The matrix spike percent recoveries were within QC limits. The duplicate has a high RPD for Orthophosphorus. The results are advisory. No corrective action was taken.

### pH - EPA Method 9045A

The samples were prepared and analyzed within the recommended holding times.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 10:29

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample SO-PTC-002-091314-2.0-4.0. The duplicate RPD was within QC limits.

#### **Total Organic and Inorganic Carbon - EPA Method 9060A**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0307 has Total Carbon detected above the reporting limit. Associated detected results and QC have been flagged with an "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-002-091317-2.0-4.0. The duplicate has a high RPD for Total Carbon. The matrix spike has high spike recovery for Total Carbon. The results are advisory. No corrective action was taken.

The SRM percent recoveries were within control limits.

#### **Sulfide - Method SM4500**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-2.0-4.0**  
**1710138-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 08:30  
Analyzed: 22-Sep-2017 11:58

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFI0326 Sample Size: 1.063 g (wet) Dry Weight: 0.89 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 83.89

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.563           | 5.61            | <b>7020</b>  | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.314           | 5.61            | <b>1.57</b>  | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.404           | 5.61            | <b>10900</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0124          | 0.112           | <b>78.5</b>  | mg/kg |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-2.0-4.0**  
**1710138-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/13/2017 08:30

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.21 g (wet)

Final Volume: 40.01 mL

Dry Weight: 16.95 g

% Solids: 83.89

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>9.08</b> | pH Units |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-2.0-4.0**  
**1710138-01 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: BAL2

Sampled: 09/13/2017 08:30  
Analyzed: 15-Sep-2017 06:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10299 Sample Size: 5 g (wet) Dry Weight: 4.19 g  
Prepared: 15-Sep-2017 Final Volume: 5 g % Solids: 83.89

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>81.3</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-2.0-4.0**  
**1710138-01 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: BAL2

Sampled: 09/13/2017 08:30  
Analyzed: 15-Sep-2017 09:08

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BF10307 Sample Size: 1 g (wet) Dry Weight: 0.84 g  
Prepared: 15-Sep-2017 Final Volume: 1 g % Solids: 83.89

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>83.89</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-2.0-4.0**  
**1710138-01 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/13/2017 08:30  
Analyzed: 20-Sep-2017 12:36

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.047 g (wet) Dry Weight: 4.23 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 83.89

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.18            | <b>14.2</b> | mg/kg |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 10:29

**SO-PTC-002-091317-2.0-4.0**  
**17I0138-01RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/13/2017 08:30  
Analyzed: 15-Sep-2017 18:37

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0284 Sample Size: 3.99 g (wet) Dry Weight: 3.35 g  
Prepared: 14-Sep-2017 Final Volume: 40 mL % Solids: 83.89

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 1.20            | 1.43   | mg-P/kg |       |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 1.20            | 11.6   | mg/kg | B     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-2.0-4.0**  
**17I0138-01RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/13/2017 08:30  
Analyzed: 28-Sep-2017 12:53

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 15-Sep-2017

Final Volume: 1 % Solids: 83.89

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Inorganic Carbon |            | 1        |                 | <b>2310</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 28-Sep-2017 12:53

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BFI0307  
Prepared: 15-Sep-2017

Sample Size: 1 g (wet)  
Final Volume: 1 g Dry Weight: 0.84 g  
% Solids: 83.89

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        |                 | <b>0.23</b> | %     | B     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-2.0-4.0**  
**17I0138-01RE4 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: APOLLO1

Sampled: 09/13/2017 08:30  
Analyzed: 29-Sep-2017 13:15

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BF10307  
Prepared: 15-Sep-2017

Sample Size: 1 g (wet)  
Final Volume: 1 g

Dry Weight: 0.84 g  
% Solids: 83.89

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.09</b> | %     |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-13.0-15.0**  
**1710138-02 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 08:40  
Analyzed: 22-Sep-2017 11:47

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10326 Sample Size: 1.018 g (wet) Dry Weight: 0.46 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 45.20

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.609           | 10.9            | 7.47   | mg/kg | J     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-13.0-15.0**  
**1710138-02 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/13/2017 08:40

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.29 g (wet)

Final Volume: 40.34 mL

Dry Weight: 9.17 g

% Solids: 45.20

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.36   | pH Units |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-13.0-15.0**  
**1710138-02 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: BAL2

Sampled: 09/13/2017 08:40  
Analyzed: 15-Sep-2017 08:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10304 Sample Size: 10 g (wet) Dry Weight: 4.52 g  
Prepared: 15-Sep-2017 Final Volume: 10 g % Solids: 45.20

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>45.20</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
06-Oct-2017 10:29

**SO-PTC-002-091317-23.0-25.0**  
**1710138-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 08:50  
Analyzed: 22-Sep-2017 11:51

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10326 Sample Size: 1.021 g (wet) Dry Weight: 0.86 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 83.86

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.587           | 5.84            | <b>5920</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.327           | 5.84            | ND          | mg/kg | U     |
| Iron      | 7439-89-6  | 2        | 0.421           | 5.84            | <b>8720</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0129          | 0.117           | <b>55.2</b> | mg/kg |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-23.0-25.0**  
**1710138-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 09/13/2017 08:50  
Analyzed: 27-Sep-2017 13:08

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFI0623 Sample Size: 20.08 g (wet) Dry Weight: 16.84 g  
Prepared: 25-Sep-2017 Final Volume: 39.92 mL % Solids: 83.86

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.10</b> | pH Units |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-23.0-25.0**  
**1710138-03 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/13/2017 08:50  
Analyzed: 29-Sep-2017 14:18

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 15-Sep-2017 Final Volume: 1 % Solids: 83.86

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | ND     | mg/kg | U     |

Instrument: APOLLO1

Analyzed: 29-Sep-2017 14:18

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BFI0307  
Prepared: 15-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 g Dry Weight: 0.84 g  
% Solids: 83.86

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.11</b> | %     |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-23.0-25.0**  
**1710138-03 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: BAL2

Sampled: 09/13/2017 08:50  
Analyzed: 15-Sep-2017 06:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10299 Sample Size: 5 g (wet) Dry Weight: 4.19 g  
Prepared: 15-Sep-2017 Final Volume: 5 g % Solids: 83.86

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>80.4</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-23.0-25.0**  
**1710138-03 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: BAL2

Sampled: 09/13/2017 08:50  
Analyzed: 15-Sep-2017 09:08

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BF10307 Sample Size: 1 g (wet) Dry Weight: 0.84 g  
Prepared: 15-Sep-2017 Final Volume: 1 g % Solids: 83.86

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>83.86</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-23.0-25.0**  
**1710138-03 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/13/2017 08:50  
Analyzed: 20-Sep-2017 12:36

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.866 g (wet) Dry Weight: 4.92 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 83.86

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.02            | ND     | mg/kg | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-23.0-25.0**  
**17I0138-03RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/13/2017 08:50  
Analyzed: 15-Sep-2017 19:27

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10284 Sample Size: 4.38 g (wet) Dry Weight: 3.67 g  
Prepared: 14-Sep-2017 Final Volume: 40 mL % Solids: 83.86

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 5.45            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 5.45            | 11.1   | mg/kg | B, D  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-23.0-25.0**  
**17I0138-03RE2 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/13/2017 08:50  
Analyzed: 28-Sep-2017 14:13

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 15-Sep-2017 Final Volume: 1 % Solids: 83.86

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Inorganic Carbon |            | 1        |                 | <b>989</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 28-Sep-2017 14:13

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BFI0307  
Prepared: 15-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 g Dry Weight: 0.84 g  
% Solids: 83.86

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        |                 | <b>0.10</b> | %     | B     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-31.0-33.0**  
**1710138-04 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 09:20  
Analyzed: 22-Sep-2017 12:18

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFI0326 Sample Size: 1.038 g (wet) Dry Weight: 0.62 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 59.70

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.452           | 8.07            | <b>5.45</b> | mg/kg | J     |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-31.0-33.0**  
**1710138-04 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/13/2017 09:20

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.04 g (wet)

Final Volume: 40.05 mL

Dry Weight: 11.96 g

% Solids: 59.70

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.64   | pH Units |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-002-091317-31.0-33.0**  
**1710138-04 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: BAL2

Sampled: 09/13/2017 09:20  
Analyzed: 15-Sep-2017 08:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10304 Sample Size: 10 g (wet) Dry Weight: 5.97 g  
Prepared: 15-Sep-2017 Final Volume: 10 g % Solids: 59.70

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>59.70</b> | %     |       |





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Reported:  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0**  
**1710138-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 13:50  
Analyzed: 22-Sep-2017 12:22

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10326 Sample Size: 1.053 g (wet) Dry Weight: 0.82 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 77.77

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.613           | 6.11            | <b>13600</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.342           | 6.11            | <b>2.16</b>  | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.440           | 6.11            | <b>15200</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0135          | 0.122           | <b>149</b>   | mg/kg |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0**  
**1710138-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/13/2017 13:50

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.07 g (wet)

Final Volume: 39.91 mL

Dry Weight: 15.61 g

% Solids: 77.77

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>10.3</b> | pH Units |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0**  
**1710138-05 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/13/2017 13:50  
Analyzed: 29-Sep-2017 14:29

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 15-Sep-2017 Final Volume: 1 % Solids: 77.77

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | <b>824</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 28-Sep-2017 14:22

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BFI0307  
Prepared: 15-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 g Dry Weight: 0.78 g  
% Solids: 77.77

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        |                 | <b>0.34</b> | %     | B     |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.26</b> | %     |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0**  
**1710138-05 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: BAL2

Sampled: 09/13/2017 13:50  
Analyzed: 15-Sep-2017 06:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10299 Sample Size: 5 g (wet) Dry Weight: 3.89 g  
Prepared: 15-Sep-2017 Final Volume: 5 g % Solids: 77.77

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 74.2   | %     |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0**  
**1710138-05 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: BAL2

Sampled: 09/13/2017 13:50  
Analyzed: 15-Sep-2017 09:08

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BF10307 Sample Size: 1 g (wet) Dry Weight: 0.78 g  
Prepared: 15-Sep-2017 Final Volume: 1 g % Solids: 77.77

| Analyte      | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|--------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids |            | 1        | 0.04            | 77.77  | %     |       |



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Olympia WA, 98503

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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0**  
**1710138-05 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/13/2017 13:50  
Analyzed: 20-Sep-2017 12:36

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.108 g (wet) Dry Weight: 3.97 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 77.77

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 10       | 12.6            | 77.8   | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0**  
**17I0138-05RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/13/2017 13:50  
Analyzed: 15-Sep-2017 19:44

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10284 Sample Size: 4.46 g (wet) Dry Weight: 3.47 g  
Prepared: 14-Sep-2017 Final Volume: 40 mL % Solids: 77.77

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 11.5            | <b>11.7</b> | mg-P/kg | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 11.5            | <b>81.7</b> | mg/kg | B, D  |



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Reported:  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0-(10)**  
**1710138-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 13:50  
Analyzed: 20-Sep-2017 13:55

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0396 Sample Size: 25 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | ND            | mg/L  | U     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | ND            | mg/L  | U     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0012</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0084</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-12.0-14.0-(10)**  
**1710138-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/13/2017 13:50  
Analyzed: 20-Sep-2017 16:10

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10398 Sample Size: 20 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-16.0-18.0**  
**1710138-07 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 14:00  
Analyzed: 22-Sep-2017 12:26

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10326 Sample Size: 1.028 g (wet) Dry Weight: 0.57 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 55.81

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.488           | 8.71            | <b>10.7</b> | mg/kg |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-16.0-18.0**  
**1710138-07 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/13/2017 14:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.07 g (wet)

Final Volume: 40.27 mL

Dry Weight: 11.20 g

% Solids: 55.81

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.06</b> | pH Units |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-16.0-18.0**  
**1710138-07 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: BAL2

Sampled: 09/13/2017 14:00  
Analyzed: 15-Sep-2017 08:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10304 Sample Size: 10 g (wet) Dry Weight: 5.58 g  
Prepared: 15-Sep-2017 Final Volume: 10 g % Solids: 55.81

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>55.81</b> | %     |       |



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Reported:  
06-Oct-2017 10:29

**SO-PTC-208-091317-16.0-18.0-(10)**  
**1710138-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 14:00  
Analyzed: 20-Sep-2017 13:59

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0396 Sample Size: 25 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | ND            | mg/L  | U     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0105</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0024</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-16.0-18.0-(10)**  
**1710138-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/13/2017 14:00  
Analyzed: 20-Sep-2017 16:12

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BFI0398 Sample Size: 20 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-23.0-25.0**  
**1710138-09 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 14:20  
Analyzed: 22-Sep-2017 12:30

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10326 Sample Size: 1.089 g (wet) Dry Weight: 0.87 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 79.66

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.579           | 5.76            | <b>7020</b>  | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.323           | 5.76            | <b>10.0</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.416           | 5.76            | <b>11800</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0128          | 0.115           | <b>72.1</b>  | mg/kg |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-23.0-25.0**  
**1710138-09 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/13/2017 14:20

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.18 g (wet)

Final Volume: 40.19 mL

Dry Weight: 16.08 g

% Solids: 79.66

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.65</b> | pH Units |       |





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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-23.0-25.0**  
**1710138-09 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/13/2017 14:20  
Analyzed: 29-Sep-2017 14:45

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 15-Sep-2017 Final Volume: 1 % Solids: 79.66

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | ND     | mg/kg | U     |

Instrument: APOLLO1

Analyzed: 28-Sep-2017 14:31

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BFI0307  
Prepared: 15-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 g Dry Weight: 0.80 g  
% Solids: 79.66

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        |                 | <b>0.90</b> | %     | B     |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.88</b> | %     |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-23.0-25.0**  
**1710138-09 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: BAL2

Sampled: 09/13/2017 14:20  
Analyzed: 15-Sep-2017 06:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10299 Sample Size: 5 g (wet) Dry Weight: 3.98 g  
Prepared: 15-Sep-2017 Final Volume: 5 g % Solids: 79.66

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>75.0</b> | %     |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-23.0-25.0**  
**1710138-09 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: BAL2

Sampled: 09/13/2017 14:20  
Analyzed: 15-Sep-2017 09:08

Sample Preparation: Preparation Method: Plumb 1981  
Preparation Batch: BF10307 Sample Size: 1 g (wet) Dry Weight: 0.80 g  
Prepared: 15-Sep-2017 Final Volume: 1 g % Solids: 79.66

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>79.66</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-23.0-25.0**  
**1710138-09 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/13/2017 14:20  
Analyzed: 20-Sep-2017 12:37

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.402 g (wet) Dry Weight: 4.30 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 79.66

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.16            | <b>2.49</b> | mg/kg |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-23.0-25.0**  
**17I0138-09RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/13/2017 14:20  
Analyzed: 15-Sep-2017 20:01

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10284 Sample Size: 4.02 g (wet) Dry Weight: 3.20 g  
Prepared: 14-Sep-2017 Final Volume: 40 mL % Solids: 79.66

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 12.5            | <b>17.4</b> | mg-P/kg | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 12.5            | <b>60.2</b> | mg/kg | B, D  |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-33.0-35.0**  
**1710138-10 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/13/2017 14:30  
Analyzed: 22-Sep-2017 12:34

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10326 Sample Size: 1.054 g (wet) Dry Weight: 0.74 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 70.39

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.378           | 6.74            | <b>3.84</b> | mg/kg | J     |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-33.0-35.0**  
**1710138-10 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/13/2017 14:30

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.12 g (wet)

Final Volume: 40.27 mL

Dry Weight: 14.16 g

% Solids: 70.39

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>6.99</b> | pH Units |       |



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**Reported:**  
06-Oct-2017 10:29

**SO-PTC-208-091317-33.0-35.0**  
**1710138-10 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: BAL2

Sampled: 09/13/2017 14:30  
Analyzed: 15-Sep-2017 08:05

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10304 Sample Size: 10 g (wet) Dry Weight: 7.04 g  
Prepared: 15-Sep-2017 Final Volume: 10 g % Solids: 70.39

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>70.39</b> | %     |       |





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Reported:  
06-Oct-2017 10:29

**Metals and Metallic Compounds - Quality Control**

**Batch BFI0326 - SWC EPA 3050B**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-----------------|-------|-------------|--|------|-------------|-------|-----------|-------|
| <b>Blank (BFI0326-BLK1)</b>       |        |                 |                 |       |             | Prepared: 15-Sep-2017 Analyzed: 22-Sep-2017 11:32                    |      |             |       |           |       |
| Aluminum                          | 1.34   | 0.502           | 5.00            | mg/kg |             |  |      |             |       |           | J     |
| Arsenic                           | ND     | 0.280           | 5.00            | mg/kg |             |  |      |             |       |           | U     |
| Iron                              | 0.380  | 0.361           | 5.00            | mg/kg |             |  |      |             |       |           | J     |
| Manganese                         | ND     | 0.0111          | 0.100           | mg/kg |             |  |      |             |       |           | U     |
| <b>LCS (BFI0326-BS1)</b>          |        |                 |                 |       |             | Prepared: 15-Sep-2017 Analyzed: 22-Sep-2017 12:06                    |      |             |       |           |       |
| Aluminum                          | 215    | 0.502           | 5.00            | mg/kg | 200         |  | 108  | 80-120      |       |           |       |
| Arsenic                           | 213    | 0.280           | 5.00            | mg/kg | 200         |  | 106  | 80-120      |       |           |       |
| Iron                              | 220    | 0.361           | 5.00            | mg/kg | 200         |  | 110  | 80-120      |       |           |       |
| Manganese                         | 49.6   | 0.0111          | 0.100           | mg/kg | 50.0        |  | 99.3 | 80-120      |       |           |       |
| <b>Duplicate (BFI0326-DUP1)</b>   |        |                 |                 |       |             | Source: 17I0138-01 Prepared: 15-Sep-2017 Analyzed: 22-Sep-2017 11:55 |      |             |       |           |       |
| Aluminum                          | 6430   | 0.562           | 5.60            | mg/kg |             | 7020   |      |             | 8.70  | 20        |       |
| Arsenic                           | 2.17   | 0.314           | 5.60            | mg/kg |             | 1.57   |      |             | 31.90 | 20        | L, J  |
| Iron                              | 11000  | 0.404           | 5.60            | mg/kg |             | 10900  |      |             | 0.93  | 20        |       |
| Manganese                         | 74.4   | 0.0124          | 0.112           | mg/kg |             | 78.5   |      |             | 5.31  | 20        |       |
| <b>Matrix Spike (BFI0326-MS1)</b> |        |                 |                 |       |             | Source: 17I0138-01 Prepared: 15-Sep-2017 Analyzed: 22-Sep-2017 12:02 |      |             |       |           |       |
| Aluminum                          | 6930   | 0.565           | 5.62            | mg/kg | 225         | 7020   | NR   | 75-125      |       |           | HC    |
| Arsenic                           | 226    | 0.315           | 5.62            | mg/kg | 225         | 1.57   | 99.6 | 75-125      |       |           |       |
| Iron                              | 10700  | 0.406           | 5.62            | mg/kg | 225         | 10900  | NR   | 75-125      |       |           | HC    |
| Manganese                         | 131    | 0.0125          | 0.112           | mg/kg | 56.2        | 78.5   | 93.4 | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Reported:  
06-Oct-2017 10:29

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0396 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0396-BLK1)</b> |        |                 |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 13:43 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0140          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Barium                      | ND     | 0.0075          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |
| Cadmium                     | 0.0013 | 0.0006          | 0.0100          | mg/L  |             |   |      |             |     |           | J     |
| Chromium                    | ND     | 0.0024          | 0.0250          | mg/L  |             |   |      |             |     |           | U     |
| Lead                        | ND     | 0.0065          | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| Selenium                    | ND     | 0.0408          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Silver                      | ND     | 0.0022          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |



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**Reported:**  
06-Oct-2017 10:29

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0398 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0398-BLK1)</b> |        |                 |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 16:09 |      |             |     |           |       |
| Mercury                     | ND     | 0.000007        | 0.000100        | mg/L  |             |   |      |             |     |           | U     |



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Reported:  
06-Oct-2017 10:29

Wet Chemistry - Quality Control

Batch BFI0284 - EPA 300.0 11.7

Instrument: DX500 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units   | Spike Level                                       | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|---|---------|---|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFI0284-BLK1)</b>       |        | Prepared: 14-Sep-2017 Analyzed: 14-Sep-2017 20:50 |         |   |               |      |             |       |           |       |
| Orthophosphorus                   | ND     | 1.00  | mg-P/kg |   |               |      |             |       |           | U     |
| Sulfate                           | ND     | 1.00  | mg/kg   |   |               |      |             |       |           | U     |
| <b>Blank (BFI0284-BLK2)</b>       |        | Prepared: 14-Sep-2017 Analyzed: 15-Sep-2017 18:03 |         |   |               |      |             |       |           |       |
| Orthophosphorus                   | ND     | 1.00  | mg-P/kg |   |               |      |             |       |           | U     |
| Sulfate                           | 1.21   | 1.00  | mg/kg   |   |               |      |             |       |           | *     |
| <b>Blank (BFI0284-BLK3)</b>       |        | Prepared: 14-Sep-2017 Analyzed: 16-Sep-2017 17:41 |         |   |               |      |             |       |           |       |
| Sulfate                           | ND     | 1.00  | mg/kg   |   |               |      |             |       |           | U     |
| <b>LCS (BFI0284-BS1)</b>          |        | Prepared: 14-Sep-2017 Analyzed: 14-Sep-2017 21:07 |         |   |               |      |             |       |           |       |
| Orthophosphorus                   | 99.3   | 5.00  | mg-P/kg | 100   |               | 99.3 | 75-125      |       |           | D     |
| Sulfate                           | 97.4   | 5.00  | mg/kg   | 100   |               | 97.4 | 75-125      |       |           | D, B  |
| <b>LCS (BFI0284-BS2)</b>          |        | Prepared: 14-Sep-2017 Analyzed: 15-Sep-2017 18:20 |         |   |               |      |             |       |           |       |
| Orthophosphorus                   | 101    | 5.00  | mg-P/kg | 100   |               | 101  | 75-125      |       |           | D     |
| Sulfate                           | 99.1   | 5.00  | mg/kg   | 100   |               | 99.1 | 75-125      |       |           | D, B  |
| <b>Duplicate (BFI0284-DUP2)</b>   |        | Source: 17I0138-01RE1                             |         | Prepared: 14-Sep-2017 Analyzed: 15-Sep-2017 18:53 |               |      |             |       |           |       |
| Orthophosphorus                   | 4.22   | 1.19  | mg-P/kg |   | 1.43          |      |             | 98.60 | 20        | *, L  |
| Sulfate                           | 12.4   | 1.19  | mg/kg   |   | 11.6          |      |             | 7.00  | 20        | B     |
| <b>Matrix Spike (BFI0284-MS2)</b> |        | Source: 17I0138-01RE1                             |         | Prepared: 14-Sep-2017 Analyzed: 15-Sep-2017 19:10 |               |      |             |       |           |       |
| Orthophosphorus                   | 107    | 5.35  | mg-P/kg | 107   | 1.43          | 100  | 75-125      |       |           | D     |
| Sulfate                           | 115    | 5.35  | mg/kg   | 107   | 11.6          | 96.3 | 75-125      |       |           | D, B  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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**Reported:**  
06-Oct-2017 10:29

**Wet Chemistry - Quality Control**

**Batch BFI0299 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFI0299-BLK1)</b>     |        |                 |       |             | Prepared: 15-Sep-2017 Analyzed: 15-Sep-2017 06:42                    |      |             |      |           |       |
| Total Solids, Sulfide           | ND     | 0.040           | %     |             |  |      |             |      |           | U     |
| <b>Duplicate (BFI0299-DUP1)</b> |        |                 |       |             | Source: 17I0138-01 Prepared: 15-Sep-2017 Analyzed: 15-Sep-2017 06:42 |      |             |      |           |       |
| Total Solids, Sulfide           | 80.9   | 0.040           | %     |             | 81.3   |      |             | 0.55 | 20        |       |



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**Reported:**  
06-Oct-2017 10:29

**Wet Chemistry - Quality Control**

**Batch BFI0304 - No Prep Wet Chem**

Instrument: BAL2 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFI0304-BLK1)</b>     |        |                 |       |             | Prepared: 15-Sep-2017 Analyzed: 15-Sep-2017 08:05                    |      |             |      |           |       |
| Total Solids                    | ND     | 0.04            | %     |             |  |      |             |      |           | U     |
| <b>Duplicate (BFI0304-DUP1)</b> |        |                 |       |             | Source: 17I0138-02 Prepared: 15-Sep-2017 Analyzed: 15-Sep-2017 08:05 |      |             |      |           |       |
| Total Solids                    | 43.05  | 0.04            | %     |             | 45.20  |      |             | 4.87 | 20        |       |



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Reported:  
06-Oct-2017 10:29

Wet Chemistry - Quality Control

Batch BFI0307 - Plumb 1981

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte   | Result | Reporting Limit | Units | Spike Level   | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|--------|-----------------|-------|---|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFI0307-BLK1)</b>   |        |                 |       | Prepared: 15-Sep-2017 Analyzed: 28-Sep-2017 12:09                       |               |      |             |       |           |       |
| Total Carbon  | 0.003  |                 | %     |   |               |      |             |       |           |       |
| Total Organic Carbon  | ND     | 0.02            | %     |   |               |      |             |       |           | U     |
| Total Solids  | ND     | 0.04            | %     |   |               |      |             |       |           | U     |
| <b>Blank (BFI0307-BLK2)</b>   |        |                 |       | Prepared: 15-Sep-2017 Analyzed: 29-Sep-2017 11:03                       |               |      |             |       |           |       |
| Total Organic Carbon  | ND     | 0.02            | %     |   |               |      |             |       |           | U     |
| <b>Duplicate (BFI0307-DUP1)</b>   |        |                 |       | Source: 17I0138-01RE1 Prepared: 15-Sep-2017 Analyzed: 28-Sep-2017 13:02 |               |      |             |       |           |       |
| Total Carbon  | 0.17   |                 | %     |   | 0.23          |      |             | 28.60 | 20        | *, B  |
| Total Solids  | 85.59  | 0.04            | %     |   | 83.89         |      |             | 2.01  | 20        |       |
| <b>Duplicate (BFI0307-DUP2)</b>   |        |                 |       | Source: 17I0138-01RE1 Prepared: 15-Sep-2017 Analyzed: 15-Sep-2017 09:08 |               |      |             |       |           |       |
| Total Solids  | 85.74  | 0.04            | %     |   | 83.89         |      |             | 2.19  | 20        |       |
| <b>Duplicate (BFI0307-DUP4)</b>   |        |                 |       | Source: 17I0138-01RE4 Prepared: 15-Sep-2017 Analyzed: 29-Sep-2017 11:55 |               |      |             |       |           |       |
| Total Organic Carbon  | 0.07   | 0.02            | %     |   | 0.09          |      |             | 16.00 | 20        |       |
| <b>Duplicate (BFI0307-DUP6)</b>   |        |                 |       | Source: 17I0138-01RE4 Prepared: 15-Sep-2017 Analyzed: 29-Sep-2017 12:28 |               |      |             |       |           |       |
| Total Organic Carbon  | 0.10   | 0.02            | %     |   | 0.09          |      |             | 15.60 | 20        |       |
| <b>Matrix Spike (BFI0307-MS1)</b>   |        |                 |       | Source: 17I0138-01 Prepared: 15-Sep-2017 Analyzed: 28-Sep-2017 13:24    |               |      |             |       |           |       |
| Total Carbon  | 2.39   |                 | %     | 1.66  | 0.25          | 129  | 75-125      |       |           | *, B  |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |                 |       |   |               |      |             |       |           |       |
| <b>DL (BFI0307-MS3)</b>   |        |                 |       | Source: 17I0138-01RE4 Prepared: 15-Sep-2017 Analyzed: 29-Sep-2017 14:05 |               |      |             |       |           |       |
| Total Organic Carbon  | 1.74   | 0.02            | %     | 1.66  | 0.09          | 99.7 | 75-125      |       |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |                 |       |   |               |      |             |       |           |       |
| <b>Reference (BFI0307-SRM1)</b>   |        |                 |       | Prepared: 15-Sep-2017 Analyzed: 29-Sep-2017 11:13                       |               |      |             |       |           |       |
| Total Organic Carbon  | 2.74   | 0.02            | %     | 2.45  |               | 112  | 75-125      |       |           |       |
| <b>Reference (BFI0307-SRM2)</b>   |        |                 |       | Prepared: 15-Sep-2017 Analyzed: 28-Sep-2017 12:21                       |               |      |             |       |           |       |
| Total Carbon  | 3.65   |                 | %     | 3.35  |               | 109  | 80-120      |       |           | B     |



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**Reported:**  
06-Oct-2017 10:29

**Wet Chemistry - Quality Control**

**Batch BFI0401 - PSEP 1986**

Instrument: UV1800-1 Analyst: GM

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0401-BLK1)</b> |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 12:35 |      |             |     |           |       |
| Sulfide                     | ND     | 1.00            | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BFI0401-BS1)</b>    |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 12:35 |      |             |     |           |       |
| Sulfide                     | 123    | 10.0            | mg/kg | 159         |   | 77.5 | 75-125      |     |           | D     |





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**Reported:**  
06-Oct-2017 10:29

**Wet Chemistry - Quality Control**

**Batch BFI0623 - EPA 9045D**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte               | Result | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|-------------|--|------|-------------|------|-----------|-------|
| <b>LCS (BFI0623-BS1)</b>        |        |                 |          |             | Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08                    |      |             |      |           |       |
| pH                              | 7.02   | 0.01            | pH Units | 8.75        |  | 80.2 | 0-200       |      |           |       |
| <b>Duplicate (BFI0623-DUP1)</b> |        |                 |          |             | Source: 17I0138-01 Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08 |      |             |      |           |       |
| pH                              | 9.11   | 0.02            | pH Units |             | 9.08   |      |             | 0.33 | 20        |       |



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Reported:  
06-Oct-2017 10:29

**Certified Analyses included in this Report**

| Analyte                         | Certifications             |
|---------------------------------|----------------------------|
| <b>EPA 300.0 in Solid</b>       |                            |
| Orthophosphorus                 | DoD-ELAP,WA-DW,WADOE,NELAP |
| Sulfate                         | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 6010C in Solid</b>       |                            |
| Aluminum                        | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | NELAP,WADOE,DoD-ELAP,ADEC  |
| Iron                            | NELAP,WADOE,DoD-ELAP       |
| Manganese                       | NELAP,WADOE,DoD-ELAP       |
| Silver                          | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | CALAP,NELAP,WADOE          |
| Barium                          | CALAP,NELAP,WADOE          |
| Cadmium                         | NELAP,WADOE,DoD-ELAP       |
| Chromium                        | NELAP,WADOE,DoD-ELAP       |
| Lead                            | NELAP,WADOE,DoD-ELAP       |
| Selenium                        | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 7470A in Solid</b>       |                            |
| Mercury                         | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b>       |                            |
| pH                              | WADOE,CALAP,DoD-ELAP,NELAP |
| <b>EPA 9060A m in Solid</b>     |                            |
| Total Organic Carbon            | WADOE                      |
| <b>SM 4500-S2 D-00 in Solid</b> |                            |
| Sulfide                         | DoD-ELAP,NELAP,WADOE       |

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 10:29

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



09 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17I0167

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



Date: 9/14/2017  
Page: 1 of 1  
No. of Coolers: \_\_\_\_\_  
Cooler Temps: \_\_\_\_\_

Turn-around Requested: Normal  
ARI Assigned Number: 1710167  
ARI Client Company: Pioneer Technologies  
Phone: 360-570-1700  
Client Contact: Troy Bussey (busseyt@uspioneer.com)

| Sample ID                        | Date   | Time  | Matrix | No. Containers  | Analysis Requested               |  |                |                               |  |                           |                             | Notes/Comments |  |  |  |
|----------------------------------|--|---|--------|-----------------|----------------------------------|--|----------------|-------------------------------|--|---------------------------|-----------------------------|----------------|--|--|--|
|                                  |  |   |        |                 | Total Arsenic<br>EPA 3050B/6010C | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Ag<br>EPA 1311/6010C/7470A | pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 3050B/6010C | Sulfate, Ortho-phosphorus<br>EPA 300.0 | TOC, TIC<br>EPA 9060A Mod | Sulfide<br>SM 4500-S2(PSEP) |                |  |  |  |
| 50-PTC-101-091417-8.2-10.2       | 9/14/17  | 1350  | Soil   | 1-1602<br>1-202 | X                                |  |                | X                             | X                                      | X                         |                             |                |  |  |  |
| 50-PTC-101-091417-8.2-10.2-(10)  | 9/14/17  | 1350  | Soil   | 1-462           |                                  | X  |                |                               |  |                           |                             |                |  |  |  |
| 50-PTC-101-091417-13.0-15.0      | 9/14/17  | 1400  | Soil   | 1-1602          | X                                |  |                | X                             |  |                           |                             |                |  |  |  |
| 50-PTC-101-091417-13.0-15.0-(10) | 9/14/17  | 1400  | Soil   | 1-462           |                                  | X  |                |                               |  |                           |                             |                |  |  |  |
| 50-PTC-101-091417-19.3-20.3      | 9/14/17  | 1405  | Soil   | 1-1602<br>1-202 | X                                |  |                | X                             | X                                      | X                         |                             |                |  |  |  |
| 50-PTC-101-091417-360-380        | 9/14/17  | 1500  | Soil   | 1-1602          | X                                |  |                | X                             |  |                           |                             |                |  |  |  |
|                                  |  |   |        |                 |                                  |  |                |                               |  |                           |                             |                |  |  |  |
|                                  |  |   |        |                 |                                  |  |                |                               |  |                           |                             |                |  |  |  |
|                                  |  |   |        |                 |                                  |  |                |                               |  |                           |                             |                |  |  |  |
|                                  |  |   |        |                 |                                  |  |                |                               |  |                           |                             |                |  |  |  |
|                                  |  |   |        |                 |                                  |  |                |                               |  |                           |                             |                |  |  |  |
|                                  |  |   |        |                 |                                  |  |                |                               |  |                           |                             |                |  |  |  |
| Comments/Special Instructions    | Relinquished by: (Signature) <i>Lucas Kern</i> | Received by: (Signature) <i>Shelby Fishel</i> |        |                 |                                  | Relinquished by: (Signature)   |                |                               | Received by: (Signature)               |                           |                             |                |  |  |  |
| ulfides preserved w/ZnAc         | Printed Name: Lucas Kern                       | Printed Name: Shelby Fishel                   |        |                 |                                  | Printed Name:  |                |                               | Printed Name:                          |                           |                             |                |  |  |  |
| submit EDD to PIONEER using      | Company: DOF                                   | Company: ARI                                  |        |                 |                                  | Company:   |                |                               | Company:                               |                           |                             |                |  |  |  |
| PIONEER EDD format               | Date & Time: 9/14/17 17:00                     | Date & Time: 9/14/17 1700                     |        |                 |                                  | Date & Time:   |                |                               | Date & Time:                           |                           |                             |                |  |  |  |
| fill to Port of Tacoma           |  |   |        |                 |                                  |  |                |                               |  |                           |                             |                |  |  |  |
| O#79227                          |  |   |        |                 |                                  |  |                |                               |  |                           |                             |                |  |  |  |

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Cooler Receipt Form

ARI Client: Pioneer Technology

Project Name: Arkema FSDS Inv

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17I0167

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)  
Time: 1700 11.6

If cooler temperature is out of compliance fill out form-00070F

Temp Gun ID#: D005206

Cooler Accepted by: [Signature] Date: 9/14/17 Time: 1700

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO

Were all VOC vials free of air bubbles? ..... NA  YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI..... NA

Was Sample Split by ARI : NA  YES  Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

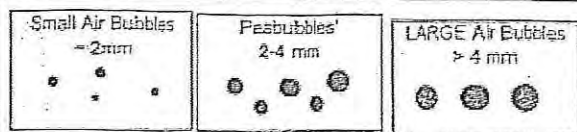
Samples Logged by: B.H. Date: 9/15/17 Time: 10:02

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

By: \_\_\_\_\_ Date: \_\_\_\_\_



Small → "sm" (< 2 mm)  
Peabubbles → "pb" (2 to < 4 mm)  
Large → "lg" (4 to < 6 mm)  
Headspace → "hs" (> 6 mm)





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 13:14

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-101-091417-8.2-10.2       | 17I0167-01    | Solid  | 14-Sep-2017 13:50 | 14-Sep-2017 17:00 |
| SO-PTC-101-091417-8.2-10.2-(10)  | 17I0167-02    | Solid  | 14-Sep-2017 13:50 | 14-Sep-2017 17:00 |
| SO-PTC-101-091417-13.0-15.0      | 17I0167-03    | Solid  | 14-Sep-2017 14:00 | 14-Sep-2017 17:00 |
| SO-PTC-101-091417-13.0-15.0-(10) | 17I0167-04    | Solid  | 14-Sep-2017 14:00 | 14-Sep-2017 17:00 |
| SO-PTC-101-091417-19.3-20.3      | 17I0167-05    | Solid  | 14-Sep-2017 14:05 | 14-Sep-2017 17:00 |
| SO-PTC-101-091417-36.0-38.0      | 17I0167-06    | Solid  | 14-Sep-2017 15:00 | 14-Sep-2017 17:00 |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 13:14

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 14, 2017 under ARI workorder 1710167. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total and TCLP Metals - EPA Methods 6010C and 7471B

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0326 (total) has Aluminum and Iron detected below the reporting limits, but above the method detection limits. Method blank BFI0396 (TCLP) has Cadmium detected below the reporting limit, but above the method detection limit. These metals have been flagged with "J" qualifiers on their associated method blanks. No further corrective action was taken.

The LCS percent recoveries were within control limits.

### Anions - EPA 300.0

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0324 has Sulfate detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-101-091417-8.2-10.2. The matrix spike percent recoveries were within QC limits. The duplicate has a high RPD for Orthophosphorus. The results are advisory. No corrective action was taken.

### pH - EPA Method 9045A

The samples were prepared and analyzed within the recommended holding times.

The LCS percent recoveries were within control limits.

### Total Organic and Inorganic Carbon - EPA Method 9060A

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.



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Reported:  
06-Oct-2017 13:14

Method blank BFI0307 has Total Carbon detected above the reporting limit. Associated detected results and QC have been flagged with an "B" qualifier. No further corrective action was taken.

The SRM percent recoveries were within control limits.

#### **Sulfide - Method SM4500**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.



Pioneer Technologies Corporation  
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Olympia WA, 98503

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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2**  
**1710167-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/14/2017 13:50  
Analyzed: 22-Sep-2017 12:37

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10326 Sample Size: 1.079 g (wet) Dry Weight: 0.89 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 82.39

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.565           | 5.62            | <b>6760</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.315           | 5.62            | <b>786</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.406           | 5.62            | <b>9390</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0125          | 0.112           | <b>63.1</b> | mg/kg |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2**  
**1710167-01 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/14/2017 13:50  
Analyzed: 16-Sep-2017 11:17

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10324 Sample Size: 4.44 g (wet) Dry Weight: 3.66 g  
Prepared: 15-Sep-2017 Final Volume: 40 mL % Solids: 82.39

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 10.9            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 10.9            | <b>41.2</b> | mg/kg | D, B  |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2**  
**1710167-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/14/2017 13:50

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.36 g (wet)

Final Volume: 40.34 mL

Dry Weight: 16.78 g

% Solids: 82.39

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.64   | pH Units |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2**  
**1710167-01 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/14/2017 13:50  
Analyzed: 02-Oct-2017 15:13

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017

Final Volume: 1 % Solids: 82.39

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | <b>1330</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 02-Oct-2017 15:13

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017

Sample Size: 1 g (wet) Dry Weight: 0.82 g  
Final Volume: 1 mL % Solids: 82.39

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.13</b> | %     |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2**  
**1710167-01 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/14/2017 13:50  
Analyzed: 19-Sep-2017 12:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10403 Sample Size: 5 g (wet) Dry Weight: 4.12 g  
Prepared: 19-Sep-2017 Final Volume: 5 g % Solids: 82.39

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 75.2   | %     |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2**  
**1710167-01 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/14/2017 13:50  
Analyzed: 19-Sep-2017 11:45

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BF10390 Sample Size: 1 g (wet) Dry Weight: 0.82 g  
Prepared: 19-Sep-2017 Final Volume: 1 mL % Solids: 82.39

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>82.39</b> | %     |       |





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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2**  
**1710167-01 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/14/2017 13:50  
Analyzed: 20-Sep-2017 12:37

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.11 g (wet) Dry Weight: 4.21 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 82.39

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.19            | ND     | mg/kg | U     |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2**  
**17I0167-01RE2 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/14/2017 13:50  
Analyzed: 04-Oct-2017 09:55

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017

Final Volume: 1 % Solids: 82.39

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | ND     | mg/kg | U     |

Instrument: APOLLO1

Analyzed: 04-Oct-2017 09:55

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017

Sample Size: 1 g (wet) Dry Weight: 0.82 g  
Final Volume: 1 mL % Solids: 82.39

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.14</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2-(10)**  
**1710167-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/14/2017 13:50  
Analyzed: 20-Sep-2017 14:03

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BF10396 Sample Size: 25 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>10.1</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0282</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0642</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0076</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-8.2-10.2-(10)**  
**1710167-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/14/2017 13:50  
Analyzed: 20-Sep-2017 16:14

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10398 Sample Size: 20 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-13.0-15.0**  
**1710167-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/14/2017 14:00  
Analyzed: 25-Sep-2017 18:15

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10326 Sample Size: 1.044 g (wet) Dry Weight: 0.54 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 52.16

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.29            | 23.0            | <b>4880</b> | mg/kg | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-13.0-15.0**  
**1710167-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/14/2017 14:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.48 g (wet)

Final Volume: 40.38 mL

Dry Weight: 10.68 g

% Solids: 52.16

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>6.98</b> | pH Units |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-13.0-15.0**  
**1710167-03 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/14/2017 14:00  
Analyzed: 19-Sep-2017 12:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10402 Sample Size: 10 g (wet) Dry Weight: 5.22 g  
Prepared: 19-Sep-2017 Final Volume: 10 g % Solids: 52.16

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>52.16</b> | %     |       |



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Reported:  
06-Oct-2017 13:14

**SO-PTC-101-091417-13.0-15.0-(10)**  
**1710167-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/14/2017 14:00  
Analyzed: 20-Sep-2017 14:07

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0396 Sample Size: 25 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>87.5</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0174</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 50       | 0.0062          | 0.100           | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0141</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-13.0-15.0-(10)**  
**1710167-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/14/2017 14:00  
Analyzed: 20-Sep-2017 16:15

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10398 Sample Size: 20 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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Reported:  
06-Oct-2017 13:14

**SO-PTC-101-091417-19.3-20.3**  
**1710167-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/14/2017 14:05  
Analyzed: 22-Sep-2017 12:45

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFI0326 Sample Size: 1.033 g (wet) Dry Weight: 0.76 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 73.35

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.663           | 6.60            | <b>12500</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.370           | 6.60            | <b>301</b>   | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.476           | 6.60            | <b>18500</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0146          | 0.132           | <b>128</b>   | mg/kg |       |



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Reported:  
06-Oct-2017 13:14

**SO-PTC-101-091417-19.3-20.3**  
**1710167-05 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/14/2017 14:05  
Analyzed: 16-Sep-2017 12:08

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0324 Sample Size: 4.33 g (wet) Dry Weight: 3.18 g  
Prepared: 15-Sep-2017 Final Volume: 40 mL % Solids: 73.35

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 12.6            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 12.6            | <b>142</b> | mg/kg | D, B  |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-19.3-20.3**  
**1710167-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/14/2017 14:05

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.09 g (wet)

Final Volume: 40.06 mL

Dry Weight: 14.74 g

% Solids: 73.35

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>6.40</b> | pH Units |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-19.3-20.3**  
**1710167-05 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/14/2017 14:05  
Analyzed: 04-Oct-2017 10:08

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017 Final Volume: 1 % Solids: 73.35

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Inorganic Carbon |            | 1        | 400             | <b>1800</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 02-Oct-2017 15:25

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017 Sample Size: 1 g (wet) Dry Weight: 0.73 g  
Final Volume: 1 mL % Solids: 73.35

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.57</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.39</b> | %     |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-19.3-20.3**  
**1710167-05 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/14/2017 14:05  
Analyzed: 19-Sep-2017 12:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10403 Sample Size: 5 g (wet) Dry Weight: 3.67 g  
Prepared: 19-Sep-2017 Final Volume: 5 g % Solids: 73.35

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>68.2</b> | %     |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-19.3-20.3**  
**1710167-05 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/14/2017 14:05  
Analyzed: 19-Sep-2017 11:45

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BF10390 Sample Size: 1 g (wet) Dry Weight: 0.73 g  
Prepared: 19-Sep-2017 Final Volume: 1 mL % Solids: 73.35

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>73.35</b> | %     |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-19.3-20.3**  
**1710167-05 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/14/2017 14:05  
Analyzed: 20-Sep-2017 12:38

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.304 g (wet) Dry Weight: 3.89 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 73.35

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.29            | <b>2.65</b> | mg/kg |       |





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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-36.0-38.0**  
**1710167-06 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/14/2017 15:00  
Analyzed: 22-Sep-2017 12:48

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFI0326 Sample Size: 1.066 g (wet) Dry Weight: 0.63 g  
Prepared: 15-Sep-2017 Final Volume: 50 mL % Solids: 59.34

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.443           | 7.90            | 5.47   | mg/kg | J     |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-36.0-38.0**  
**1710167-06 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/14/2017 15:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0623

Prepared: 25-Sep-2017

Sample Size: 20.37 g (wet)

Final Volume: 40.36 mL

Dry Weight: 12.09 g

% Solids: 59.34

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>7.09</b> | pH Units |       |



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**Reported:**  
06-Oct-2017 13:14

**SO-PTC-101-091417-36.0-38.0**  
**1710167-06 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/14/2017 15:00  
Analyzed: 19-Sep-2017 12:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10402 Sample Size: 10 g (wet) Dry Weight: 5.93 g  
Prepared: 19-Sep-2017 Final Volume: 10 g % Solids: 59.34

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>59.34</b> | %     |       |



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Reported:  
06-Oct-2017 13:14

**Metals and Metallic Compounds - Quality Control**

**Batch BFI0326 - SWC EPA 3050B**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0326-BLK1)</b> |        |                 |                 |       |             | Prepared: 15-Sep-2017 Analyzed: 22-Sep-2017 11:32 |      |             |     |           |       |
| Aluminum                    | 1.34   | 0.502           | 5.00            | mg/kg |             |   |      |             |     |           | J     |
| Arsenic                     | ND     | 0.280           | 5.00            | mg/kg |             |   |      |             |     |           | U     |
| Iron                        | 0.380  | 0.361           | 5.00            | mg/kg |             |   |      |             |     |           | J     |
| Manganese                   | ND     | 0.0111          | 0.100           | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BFI0326-BS1)</b>    |        |                 |                 |       |             | Prepared: 15-Sep-2017 Analyzed: 22-Sep-2017 12:06 |      |             |     |           |       |
| Aluminum                    | 215    | 0.502           | 5.00            | mg/kg | 200         |   | 108  | 80-120      |     |           |       |
| Arsenic                     | 213    | 0.280           | 5.00            | mg/kg | 200         |   | 106  | 80-120      |     |           |       |
| Iron                        | 220    | 0.361           | 5.00            | mg/kg | 200         |   | 110  | 80-120      |     |           |       |
| Manganese                   | 49.6   | 0.0111          | 0.100           | mg/kg | 50.0        |   | 99.3 | 80-120      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 13:14

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0396 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0396-BLK1)</b> |        |                 |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 13:43 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0140          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Barium                      | ND     | 0.0075          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |
| Cadmium                     | 0.0013 | 0.0006          | 0.0100          | mg/L  |             |   |      |             |     |           | J     |
| Chromium                    | ND     | 0.0024          | 0.0250          | mg/L  |             |   |      |             |     |           | U     |
| Lead                        | ND     | 0.0065          | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| Selenium                    | ND     | 0.0408          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Silver                      | ND     | 0.0022          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>06-Oct-2017 13:14 |
|--|--|---------------------------------------|

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0398 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0398-BLK1)</b> |        |                 |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 16:09 |      |             |     |           |       |
| Mercury                     | ND     | 0.000007        | 0.000100        | mg/L  |             |   |      |             |     |           | U     |



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Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 13:14

Wet Chemistry - Quality Control

Batch BFI0324 - EPA 300.0 11.7

Instrument: DX500 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units   | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|---|---------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFI0324-BLK1)</b>       |        | Prepared: 15-Sep-2017 Analyzed: 16-Sep-2017 10:44 |         |   |               |      |             |      |           |       |
| Orthophosphorus                   | ND     | 1.00  | mg-P/kg |   |               |      |             |      |           | U     |
| Sulfate                           | 1.12   | 1.00  | mg/kg   |   |               |      |             |      |           | *     |
| <b>Blank (BFI0324-BLK2)</b>       |        | Prepared: 15-Sep-2017 Analyzed: 16-Sep-2017 17:58 |         |   |               |      |             |      |           |       |
| Sulfate                           | ND     | 1.00  | mg/kg   |   |               |      |             |      |           | U     |
| <b>LCS (BFI0324-BS1)</b>          |        | Prepared: 15-Sep-2017 Analyzed: 16-Sep-2017 11:01 |         |   |               |      |             |      |           |       |
| Orthophosphorus                   | 102    | 5.00  | mg-P/kg | 100   |               | 102  | 75-125      |      |           | D     |
| Sulfate                           | 98.1   | 5.00  | mg/kg   | 100   |               | 98.1 | 75-125      |      |           | D, B  |
| <b>Duplicate (BFI0324-DUP1)</b>   |        | <b>Source: 17I0167-01</b>                         |         | Prepared: 15-Sep-2017 Analyzed: 16-Sep-2017 16:34 |               |      |             |      |           |       |
| Orthophosphorus                   | ND     | 11.6  | mg-P/kg |   | ND            |      |             |      |           | U     |
| Sulfate                           | 41.2   | 11.6  | mg/kg   |   | 41.2          |      |             | 0.05 | 20        | D, B  |
| <b>Matrix Spike (BFI0324-MS1)</b> |        | <b>Source: 17I0167-01</b>                         |         | Prepared: 15-Sep-2017 Analyzed: 16-Sep-2017 16:51 |               |      |             |      |           |       |
| Orthophosphorus                   | 101    | 12.0  | mg-P/kg | 120   | ND            | 83.7 | 75-125      |      |           | D     |
| Sulfate                           | 156    | 12.0  | mg/kg   | 120   | 41.2          | 95.6 | 75-125      |      |           | B, D  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 13:14

**Wet Chemistry - Quality Control**

**Batch BFI0390 - PSEP 1986 (modified)**

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------------------------------|--------|---|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0390-BLK1)</b>     |        | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 11:45 |       |             |               |      |             |     |           |       |
| Total Solids                    | ND     | 0.04  | %     |             |               |      |             |     |           | U     |
| <b>Blank (BFI0390-BLK2)</b>     |        | Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 14:24 |       |             |               |      |             |     |           |       |
| Total Carbon                    | ND     | 0.02  | %     |             |               |      |             |     |           | U     |
| <b>Blank (BFI0390-BLK3)</b>     |        | Prepared: 19-Sep-2017 Analyzed: 04-Oct-2017 08:29 |       |             |               |      |             |     |           |       |
| Total Organic Carbon            | ND     | 0.02  | %     |             |               |      |             |     |           | U     |
| <b>Reference (BFI0390-SRM1)</b> |        | Prepared: 19-Sep-2017 Analyzed: 04-Oct-2017 08:52 |       |             |               |      |             |     |           |       |
| Total Organic Carbon            | 2.08   | 0.02  | %     | 2.45        |               | 85.1 | 75-125      |     |           |       |
| <b>Reference (BFI0390-SRM2)</b> |        | Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 19:49 |       |             |               |      |             |     |           |       |
| Total Carbon                    | 3.03   | 0.02  | %     | 3.35        |               | 90.4 | 80-120      |     |           |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 13:14

**Wet Chemistry - Quality Control**

**Batch BFI0401 - PSEP 1986**

Instrument: UV1800-1 Analyst: GM

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0401-BLK1)</b> |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 12:35 |      |             |     |           |       |
| Sulfide                     | ND     | 1.00            | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BFI0401-BS1)</b>    |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 12:35 |      |             |     |           |       |
| Sulfide                     | 123    | 10.0            | mg/kg | 159         |   | 77.5 | 75-125      |     |           | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 13:14

**Wet Chemistry - Quality Control**

**Batch BFI0402 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFI0402-BLK1)</b>     |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 12:28                    |      |             |      |           |       |
| Total Solids                    | ND     | 0.04            | %     |             |  |      |             |      |           | U     |
| <b>Duplicate (BFI0402-DUP1)</b> |        |                 |       |             | Source: 17I0167-03 Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 12:28 |      |             |      |           |       |
| Total Solids                    | 47.66  | 0.04            | %     |             | 52.16  |      |             | 9.02 | 20        |       |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>06-Oct-2017 13:14 |
|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFI0403 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0403-BLK1)</b> |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 12:28 |      |             |     |           |       |
| Total Solids, Sulfide       | ND     | 0.040           | %     |             |   |      |             |     |           | U     |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>06-Oct-2017 13:14 |
|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFI0623 - EPA 9045D**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte        | Result | Reporting Limit | Units    | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|--------------------------|--------|-----------------|----------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>LCS (BFI0623-BS1)</b> |        |                 |          |             |               | Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08 |             |     |           |       |
| pH                       | 7.02   | 0.01            | pH Units | 8.75        |               | 80.2  | 0-200       |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 13:14

**Certified Analyses included in this Report**

| Analyte                         | Certifications             |
|---------------------------------|----------------------------|
| <b>EPA 300.0 in Solid</b>       |                            |
| Orthophosphorus                 | DoD-ELAP,WA-DW,WADOE,NELAP |
| Sulfate                         | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 6010C in Solid</b>       |                            |
| Aluminum                        | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | NELAP,WADOE,DoD-ELAP,ADEC  |
| Iron                            | NELAP,WADOE,DoD-ELAP       |
| Manganese                       | NELAP,WADOE,DoD-ELAP       |
| Silver                          | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | CALAP,NELAP,WADOE          |
| Barium                          | CALAP,NELAP,WADOE          |
| Cadmium                         | NELAP,WADOE,DoD-ELAP       |
| Chromium                        | NELAP,WADOE,DoD-ELAP       |
| Lead                            | NELAP,WADOE,DoD-ELAP       |
| Selenium                        | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 7470A in Solid</b>       |                            |
| Mercury                         | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b>       |                            |
| pH                              | WADOE,CALAP,DoD-ELAP,NELAP |
| <b>EPA 9060A m in Solid</b>     |                            |
| Total Organic Carbon            | WADOE                      |
| <b>SM 4500-S2 D-00 in Solid</b> |                            |
| Sulfide                         | DoD-ELAP,NELAP,WADOE       |

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 13:14

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



06 October 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17I0187

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



Date: 9/15/17 of 2  
Page: 1  
No. of Coolers: 1  
Temp(s):

ARI Assigned Number: 1710187  
Turn-around Requested: Normal  
ARI Client Company: Pioneer Technologies  
Phone: 360-570-1700  
Client Contact: Troy Bussey (busseyt@uspioneer.com)  
Client Project Name: Arkema FS DG Inv  
Client Project #: 79227

| Sample ID   | Date           | Time         | Matrix      | No. Containers          | Analysis Requested                               |   |                        |                                      |  |                                    |                             | Notes/Comments                       |
|---|----------------|--------------|-------------|-------------------------|--|---|------------------------|--------------------------------------|--|------------------------------------|-----------------------------|--------------------------------------|
|   |                |              |             |                         | Total Arsenic<br>EPA 3050B/6010C                 | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Ag<br>EPA 1311/6010C/17470A | pH<br>EPA 9045         | Fe, Al, Mn<br>EPA 3050B/6010C        | Sulfate, Ortho-phosphorus<br>EPA 300.0               | TOC, TIC<br>EPA 9060A Mod          | Sulfide<br>SM 4500-S2(PSEP) |                                      |
| <u>S0-PTC-001-091517-2.5-4.5</u>  | <u>9/15/17</u> | <u>11:50</u> | <u>SOIL</u> | <u>1-16oz<br/>1-2oz</u> | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-11.5-13.5</u>  | <u>9/15/17</u> | <u>12:00</u> | <u>SOIL</u> | <u>1-16oz</u>           | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-23.0-25.0</u>  | <u>9/15/17</u> | <u>12:20</u> | <u>SOIL</u> | <u>1-16oz<br/>1-2oz</u> | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    | <u>MS/MSD</u>                        |
| <u>S0-PTC-001-091517-31.5-33.5</u>  | <u>9/15/17</u> | <u>11:20</u> | <u>SOIL</u> | <u>1-16oz</u>           | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-10.0-12.0</u>  | <u>9/15/17</u> | <u>15:50</u> | <u>SOIL</u> | <u>1-16oz<br/>1-2oz</u> | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-10.0-12.0-(10)</u>   | <u>9/15/17</u> | <u>15:50</u> | <u>SOIL</u> | <u>1-4oz</u>            | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-16.5-17.5</u>  | <u>9/15/17</u> | <u>16:00</u> | <u>SOIL</u> | <u>1-16oz</u>           | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-16.5-17.5-(10)</u>   | <u>9/15/17</u> | <u>16:00</u> | <u>SOIL</u> | <u>1-4oz</u>            | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-28.0-30.0</u>  | <u>9/15/17</u> | <u>16:20</u> | <u>SOIL</u> | <u>1-16oz<br/>1-2oz</u> | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-37.5-39.0</u>  | <u>9/15/17</u> | <u>15:30</u> | <u>SOIL</u> | <u>1-16oz</u>           | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| <u>S0-PTC-001-091517-28.0-30.0</u>  | <u>9/15/17</u> | <u>15:30</u> | <u>SOIL</u> | <u>1-16oz</u>           | <u>X</u>   | <u>X</u>  | <u>X</u>               | <u>X</u>                             | <u>X</u>   | <u>X</u>                           | <u>X</u>                    |                                      |
| Comments/Special Instructions<br><u>ulfides preserved w/ZnAc<br/>submit EDD to PIONEER using<br/>PIONEER EDD format<br/>ill to Port of Tacoma<br/>O#79227</u> |                |              |             |                         | Received by:<br>(Signature)<br><u>Lucas Kora</u> | Printed Name:<br><u>Lucas Kora</u>  | Company:<br><u>DOF</u> | Date & Time:<br><u>9/15/17 17:20</u> | Relinquished by:<br>(Signature)<br><u>Paul Morke</u> | Printed Name:<br><u>Paul Morke</u> | Company:<br><u>ARI</u>      | Date & Time:<br><u>9/15/17 17:20</u> |

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI/release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



**Chain of Custody Record & Laboratory Analysis Request**

**Analytical Resources, Incorporated**  
 Analytical Chemists and Consultants  
 4511 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: 9/15/17  
 Page: 2 of 2  
 No. of Coolers: 2  
 Cooler Temps:

Turn-around Requested: Normal  
 Phone: 360-570-1700  
 Pioneer Technologies  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: DG Cooper 206-660-3466/1/kerne

| Sample ID  | Date    | Time | Matrix | No. Containers   | Analysis Requested   |  |  |                            |                                     |                        |                          | Notes/Comments |  |
|--|---------|------|--------|------------------|--|--|--|----------------------------|-------------------------------------|------------------------|--------------------------|----------------|--|
|  |         |      |        |                  | Total Arsenic EPA 3050B/6010C  | TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag EPA 1311/6010C/7470A  | pH EPA 9045  | Fe, Al, Mn EPA 3050B/6010C | Sulfate, Ortho-phosphorus EPA 300.0 | TOC, TIC EPA 9060A Mod | Sulfide SM 4500-S2(PSEP) |                |  |
| 58-31(0-0-091517 - 280-300-01)   | 9/15/17 | 1621 | JOL    | 1-1002<br>1-1027 | X  |  |  | X                          | X                                   | X                      | X                        |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
|  |         |      |        |                  |  |  |  |                            |                                     |                        |                          |                |  |
| Comments/Special Instructions<br>ulfides preserved w/ZnAc<br>submit EDD to PIONEER using<br>PIONEER EDD format<br>ill to Port of Tacoma<br>O#79227 |         |      |        |                  | Received by: <i>[Signature]</i><br>Printed Name: Lucas Brent<br>Company: DOF<br>Date & Time: 9/15/17 17:20 | Relinquished by: <i>[Signature]</i><br>Printed Name: Paul Mark<br>Company: ARI<br>Date & Time: 9/15/17 17:20 | Received by: <i>[Signature]</i><br>Printed Name:<br>Company:<br>Date & Time:<br> |                            |                                     |                        |                          |                |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

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# Cooler Receipt Form

ARI Client: Pioneer Technologies

Project Name: Arkema FS DG

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17I0187

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time: \_\_\_\_\_ 5.8 \_\_\_\_\_

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005206

Cooler Accepted by: PM Date: 9/15/17 Time: 17:20

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... B.H.  YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO

Were all VOC vials free of air bubbles? ..... NA  YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI..... NA

Was Sample Split by ARI :  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

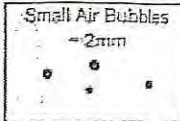
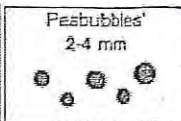
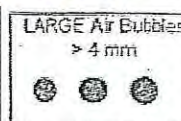
Samples Logged by: B.H. Date: 9/18/17 Time: 9:01

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**  
Label of 50-PTC-201-091517-37.5-39.0 missing sampling time.

By: B.H. Date: 9/18/17

|   |   |   |                                 |
|---|---|---|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|   |   |   | Peabubbles → "pb" (2 to < 4 mm) |
|   |   |   | Large → "lg" (4 to < 6 mm)      |
|   |   |   | Headspace → "hs" (> 6 mm)       |



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Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 14:20

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-001-091517-2.5-4.5        | 17I0187-01    | Solid  | 15-Sep-2017 11:50 | 15-Sep-2017 17:20 |
| SO-PTC-001-091517-11.5-13.5      | 17I0187-02    | Solid  | 15-Sep-2017 12:00 | 15-Sep-2017 17:20 |
| SO-PTC-001-091517-23.0-25.0      | 17I0187-03    | Solid  | 15-Sep-2017 12:20 | 15-Sep-2017 17:20 |
| SO-PTC-001-091517-31.5-33.5      | 17I0187-04    | Solid  | 15-Sep-2017 11:20 | 15-Sep-2017 17:20 |
| SO-PTC-207-091517-10.0-12.0      | 17I0187-05    | Solid  | 15-Sep-2017 15:50 | 15-Sep-2017 17:20 |
| SO-PTC-207-091517-10.0-12.0-(10) | 17I0187-06    | Solid  | 15-Sep-2017 15:50 | 15-Sep-2017 17:20 |
| SO-PTC-207-091517-16.5-17.5      | 17I0187-07    | Solid  | 15-Sep-2017 16:00 | 15-Sep-2017 17:20 |
| SO-PTC-207-091517-16.5-17.5-(10) | 17I0187-08    | Solid  | 15-Sep-2017 16:00 | 15-Sep-2017 17:20 |
| SO-PTC-207-091517-28.0-30.0      | 17I0187-09    | Solid  | 15-Sep-2017 16:20 | 15-Sep-2017 17:20 |
| SO-PTC-207-091517-37.5-39.0      | 17I0187-10    | Solid  | 15-Sep-2017 15:30 | 15-Sep-2017 17:20 |
| SO-PTC-207-091517-28.0-30.0-(01) | 17I0187-11    | Solid  | 15-Sep-2017 16:21 | 15-Sep-2017 17:20 |



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06-Oct-2017 14:20

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 15, 2017 under ARI workorder 1710187. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total and TCLP Metals - EPA Methods 6010C and 7471B

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0501 (total) has Iron detected below the reporting limits, but above the method detection limits. Method blank BFI0396 (TCLP) has Cadmium detected below the reporting limit, but above the method detection limit. These metals have been flagged with "J" qualifiers on their associated method blanks. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-001-091517-23.0-25.0 (total). The duplicate RPD were within QC limits. The matrix spike has a natural concentration of Iron that is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. The Iron has been flagged with an "HC" qualifier on the matrix spike. No further corrective action was taken.

### Anions - EPA 300.0

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-101-091417-8.2-10.2. The matrix spike percent recoveries and duplicate RPD were within QC limits.

### pH - EPA Method 9045A

The samples were prepared and analyzed within the recommended holding times.

The LCS percent recoveries were within control limits.

### Total Organic and Inorganic Carbon - EPA Method 9060A

The samples were prepared and analyzed within the recommended holding times.



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Reported:  
06-Oct-2017 14:20

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-001-091517-23.0-25.0. The matrix spike has high spike recovery for Total Carbon. The duplicates all have high RPD for Total Carbon. The results are advisory. No corrective action was taken.

#### **Sulfide - Method SM4500**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-001-091517-23.0-25.0. The matrix spike percent recovery and duplicate RPD were within QC limits.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
06-Oct-2017 14:20

**SO-PTC-001-091517-2.5-4.5**  
**1710187-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 11:50  
Analyzed: 23-Sep-2017 11:10

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.036 g (wet) Dry Weight: 0.84 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 80.98

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.599           | 5.96            | <b>7100</b>  | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.334           | 5.96            | <b>2.64</b>  | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.430           | 5.96            | <b>10200</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0132          | 0.119           | <b>64.5</b>  | mg/kg |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-2.5-4.5**  
**1710187-01 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/15/2017 11:50  
Analyzed: 18-Sep-2017 14:48

Sample Preparation: Preparation Method: MSA 24-5.3  
Preparation Batch: BF10356 Sample Size: 4.38 g (wet) Dry Weight: 3.55 g  
Prepared: 18-Sep-2017 Final Volume: 40 mL % Solids: 81.06

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 11.3            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 11.3            | <b>35.3</b> | mg/kg | D     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-2.5-4.5**  
**1710187-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/15/2017 11:50

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.35 g (wet)

Final Volume: 40.27 mL

Dry Weight: 16.50 g

% Solids: 81.06

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.11   | pH Units |       |





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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-2.5-4.5**  
**1710187-01 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/15/2017 11:50  
Analyzed: 20-Sep-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10437 Sample Size: 5 g (wet) Dry Weight: 4.05 g  
Prepared: 20-Sep-2017 Final Volume: 5 g % Solids: 81.06

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>80.1</b> | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-2.5-4.5**  
**1710187-01 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 11:50  
Analyzed: 19-Sep-2017 11:45

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BF10390 Sample Size: 1 g (wet) Dry Weight: 0.81 g  
Prepared: 19-Sep-2017 Final Volume: 1 mL % Solids: 81.06

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>81.06</b> | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-2.5-4.5**  
**1710187-01 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/15/2017 11:50  
Analyzed: 20-Sep-2017 13:04

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.653 g (wet) Dry Weight: 4.58 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 81.06

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.09            | ND     | mg/kg | U     |



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Reported:  
06-Oct-2017 14:20

**SO-PTC-001-091517-2.5-4.5**  
**17I0187-01RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/15/2017 11:50  
Analyzed: 04-Oct-2017 14:31

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017 Final Volume: 1 % Solids: 81.06

| Analyte          | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|------------------|------------|----------|-----------------|------------|-------|-------|
| Inorganic Carbon |            | 1        | 400             | <b>407</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 02-Oct-2017 18:09

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.81 g  
% Solids: 81.06

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.11</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.06</b> | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-11.5-13.5**  
**1710187-02 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 12:00  
Analyzed: 23-Sep-2017 11:14

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.028 g (wet) Dry Weight: 0.71 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 68.81

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.396           | 7.07            | <b>4.34</b> | mg/kg | J     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-11.5-13.5**  
**1710187-02 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/15/2017 12:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.05 g (wet)

Final Volume: 39.72 mL

Dry Weight: 13.33 g

% Solids: 66.50

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.44   | pH Units |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-11.5-13.5**  
**1710187-02 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 12:00  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 6.65 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 66.50

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>66.50</b> | %     |       |



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Reported:  
06-Oct-2017 14:20

**SO-PTC-001-091517-23.0-25.0**  
**1710187-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 12:20  
Analyzed: 23-Sep-2017 11:37

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.035 g (wet) Dry Weight: 0.81 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 78.29

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.620           | 6.17            | <b>6230</b>  | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.346           | 6.17            | <b>0.375</b> | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.445           | 6.17            | <b>10100</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0137          | 0.123           | <b>61.2</b>  | mg/kg |       |





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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-23.0-25.0**  
**1710187-03 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/15/2017 12:20  
Analyzed: 18-Sep-2017 15:04

Sample Preparation: Preparation Method: MSA 24-5.3  
Preparation Batch: BF10356 Sample Size: 4.11 g (wet) Dry Weight: 3.22 g  
Prepared: 18-Sep-2017 Final Volume: 40 mL % Solids: 78.26

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 12.4            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 12.4            | <b>259</b> | mg/kg | D     |



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06-Oct-2017 14:20

**SO-PTC-001-091517-23.0-25.0**  
**1710187-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 09/15/2017 12:20  
Analyzed: 27-Sep-2017 13:08

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFI0618 Sample Size: 20.41 g (wet) Dry Weight: 15.97 g  
Prepared: 25-Sep-2017 Final Volume: 40.82 mL % Solids: 78.26

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.78   | pH Units |       |



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Reported:  
06-Oct-2017 14:20

**SO-PTC-001-091517-23.0-25.0**  
**1710187-03 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/15/2017 12:20  
Analyzed: 04-Oct-2017 15:10

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017 Final Volume: 1 % Solids: 78.26

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | ND     | mg/kg | U     |

Instrument: APOLLO1

Analyzed: 04-Oct-2017 15:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.78 g  
% Solids: 78.26

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.16</b> | %     |       |



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06-Oct-2017 14:20

**SO-PTC-001-091517-23.0-25.0**  
**1710187-03 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/15/2017 12:20  
Analyzed: 20-Sep-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10437 Sample Size: 5 g (wet) Dry Weight: 3.91 g  
Prepared: 20-Sep-2017 Final Volume: 5 g % Solids: 78.26

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>78.7</b> | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-23.0-25.0**  
**1710187-03 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 12:20  
Analyzed: 19-Sep-2017 11:45

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BF10390 Sample Size: 1 g (wet) Dry Weight: 0.78 g  
Prepared: 19-Sep-2017 Final Volume: 1 mL % Solids: 78.26

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>78.26</b> | %     |       |



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06-Oct-2017 14:20

**SO-PTC-001-091517-23.0-25.0**  
**1710187-03 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/15/2017 12:20  
Analyzed: 20-Sep-2017 13:04

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.084 g (wet) Dry Weight: 3.98 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 78.26

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.26            | ND     | mg/kg | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 14:20

**SO-PTC-001-091517-23.0-25.0**  
**17I0187-03RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/15/2017 12:20  
Analyzed: 02-Oct-2017 18:31

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017 Final Volume: 1 % Solids: 78.26

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | <b>2300</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 02-Oct-2017 18:31

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.78 g  
% Solids: 78.26

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.23</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-31.5-33.5**  
**1710187-04 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 11:20  
Analyzed: 23-Sep-2017 11:18

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.018 g (wet) Dry Weight: 0.64 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 62.54

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.440           | 7.85            | <b>5.91</b> | mg/kg | J     |





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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-31.5-33.5**  
**1710187-04 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/15/2017 11:20

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.2 g (wet)

Final Volume: 40.2 mL

Dry Weight: 13.07 g

% Solids: 64.69

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.92   | pH Units |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-001-091517-31.5-33.5**  
**1710187-04 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 11:20  
Analyzed: 19-Sep-2017 12:28

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10402 Sample Size: 10 g (wet) Dry Weight: 6.47 g  
Prepared: 19-Sep-2017 Final Volume: 10 g % Solids: 64.69

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>64.69</b> | %     |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0**  
**1710187-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 15:50  
Analyzed: 23-Sep-2017 11:21

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.073 g (wet) Dry Weight: 0.83 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 76.93

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.608           | 6.06            | <b>19800</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.339           | 6.06            | <b>2.75</b>  | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.437           | 6.06            | <b>15300</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0134          | 0.121           | <b>128</b>   | mg/kg |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0**  
**1710187-05 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/15/2017 15:50  
Analyzed: 18-Sep-2017 15:55

Sample Preparation: Preparation Method: MSA 24-5.3  
Preparation Batch: BF10356 Sample Size: 4.44 g (wet) Dry Weight: 3.42 g  
Prepared: 18-Sep-2017 Final Volume: 40 mL % Solids: 76.95

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 11.7            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 11.7            | <b>28.8</b> | mg/kg | D     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0**  
**1710187-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/15/2017 15:50

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.24 g (wet)

Final Volume: 40.2 mL

Dry Weight: 15.58 g

% Solids: 76.95

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.80</b> | pH Units |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0**  
**1710187-05 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/15/2017 15:50  
Analyzed: 04-Oct-2017 14:48

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017 Final Volume: 1 % Solids: 76.95

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 400             | ND     | mg/kg | U     |

Instrument: APOLLO1

Analyzed: 02-Oct-2017 19:18

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.77 g  
% Solids: 76.95

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.33</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.30</b> | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0**  
**1710187-05 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/15/2017 15:50  
Analyzed: 20-Sep-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10437 Sample Size: 5 g (wet) Dry Weight: 3.85 g  
Prepared: 20-Sep-2017 Final Volume: 5 g % Solids: 76.95

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 75.9   | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0**  
**1710187-05 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 15:50  
Analyzed: 19-Sep-2017 11:45

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BF10390 Sample Size: 1 g (wet) Dry Weight: 0.77 g  
Prepared: 19-Sep-2017 Final Volume: 1 mL % Solids: 76.95

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>76.95</b> | %     |       |





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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0**  
**1710187-05 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/15/2017 15:50  
Analyzed: 20-Sep-2017 13:06

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.222 g (wet) Dry Weight: 4.02 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 76.95

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.24            | ND     | mg/kg | U     |



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Reported:  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0-(10)**  
**1710187-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 15:50  
Analyzed: 20-Sep-2017 15:48

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0396 Sample Size: 25 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | ND            | mg/L  | U     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0775</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-10.0-12.0-(10)**  
**1710187-06 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/15/2017 15:50  
Analyzed: 20-Sep-2017 16:22

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10398 Sample Size: 20 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-16.5-17.5**  
**1710187-07 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 16:00  
Analyzed: 23-Sep-2017 11:25

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.086 g (wet) Dry Weight: 0.64 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 58.95

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.438           | 7.81            | <b>4.98</b> | mg/kg | J     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-16.5-17.5**  
**1710187-07 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/15/2017 16:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.18 g (wet)

Final Volume: 40.31 mL

Dry Weight: 10.85 g

% Solids: 53.77

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.41</b> | pH Units |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-16.5-17.5**  
**1710187-07 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 16:00  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 5.38 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 53.77

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>53.77</b> | %     |       |



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Reported:  
06-Oct-2017 14:20

**SO-PTC-207-091517-16.5-17.5-(10)**  
**1710187-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 16:00  
Analyzed: 20-Sep-2017 15:52

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BF10396 Sample Size: 25 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.0177</b> | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0120</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0112</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-16.5-17.5-(10)**  
**1710187-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/15/2017 16:00  
Analyzed: 20-Sep-2017 16:28

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10398 Sample Size: 20 mL (wet)  
Prepared: 19-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | ND     | mg/L  | U     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0**  
**1710187-09 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 16:20  
Analyzed: 23-Sep-2017 11:29

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.092 g (wet) Dry Weight: 0.81 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 74.61

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.616           | 6.14            | <b>15600</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.344           | 6.14            | <b>2.22</b>  | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.443           | 6.14            | <b>14600</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0136          | 0.123           | <b>81.5</b>  | mg/kg |       |



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Project Number: 79227  
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Reported:  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0**  
**1710187-09 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/15/2017 16:20  
Analyzed: 18-Sep-2017 16:11

Sample Preparation: Preparation Method: MSA 24-5.3  
Preparation Batch: BF10356 Sample Size: 4.36 g (wet) Dry Weight: 3.31 g  
Prepared: 18-Sep-2017 Final Volume: 40 mL % Solids: 75.81

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 12.1            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 12.1            | <b>49.0</b> | mg/kg | D     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0**  
**1710187-09 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/15/2017 16:20

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.58 g (wet)

Final Volume: 40.61 mL

Dry Weight: 15.60 g

% Solids: 75.81

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.57   | pH Units |       |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0**  
**1710187-09 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/15/2017 16:20  
Analyzed: 04-Oct-2017 16:27

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017 Final Volume: 1 % Solids: 75.81

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Inorganic Carbon |            | 1        | 400             | <b>1830</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 02-Oct-2017 19:23

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.76 g  
% Solids: 75.81

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.77</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.58</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0**  
**1710187-09 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/15/2017 16:20  
Analyzed: 20-Sep-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10437 Sample Size: 5 g (wet) Dry Weight: 3.79 g  
Prepared: 20-Sep-2017 Final Volume: 5 g % Solids: 75.81

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>73.0</b> | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0**  
**1710187-09 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 16:20  
Analyzed: 19-Sep-2017 11:45

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BF10390 Sample Size: 1 g (wet) Dry Weight: 0.76 g  
Prepared: 19-Sep-2017 Final Volume: 1 mL % Solids: 75.81

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>75.81</b> | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0**  
**1710187-09 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/15/2017 16:20  
Analyzed: 20-Sep-2017 13:06

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.74 g (wet) Dry Weight: 4.35 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 75.81

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.15            | ND     | mg/kg | U     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-37.5-39.0**  
**1710187-10 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 15:30  
Analyzed: 23-Sep-2017 12:12

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.009 g (wet) Dry Weight: 0.71 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 70.36

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.395           | 7.04            | <b>1.85</b> | mg/kg | J     |





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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-37.5-39.0**  
**1710187-10 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/15/2017 15:30

Instrument: Accumet AR60

Analyzed: 29-Sep-2017 12:02

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BF10726

Prepared: 28-Sep-2017

Sample Size: 20.05 g (wet)

Final Volume: 39.94 mL

Dry Weight: 13.88 g

% Solids: 69.25

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.58   | pH Units |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-37.5-39.0**  
**1710187-10 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 15:30  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 6.92 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 69.25

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>69.25</b> | %     |       |



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Reported:  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0-(01)**  
**1710187-11 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/15/2017 16:21  
Analyzed: 23-Sep-2017 12:16

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.067 g (wet) Dry Weight: 0.79 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 73.87

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.637           | 6.34            | <b>15500</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.355           | 6.34            | <b>2.44</b>  | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.458           | 6.34            | <b>16000</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0140          | 0.127           | <b>86.8</b>  | mg/kg |       |



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Reported:  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0-(01)**  
**1710187-11 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/15/2017 16:21  
Analyzed: 18-Sep-2017 16:28

Sample Preparation: Preparation Method: MSA 24-5.3  
Preparation Batch: BF10356 Sample Size: 4.41 g (wet) Dry Weight: 3.31 g  
Prepared: 18-Sep-2017 Final Volume: 40 mL % Solids: 75.06

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 12.1            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 12.1            | <b>54.2</b> | mg/kg | D     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0-(01)**  
**1710187-11 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/15/2017 16:21

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.17 g (wet)

Final Volume: 40.06 mL

Dry Weight: 15.14 g

% Solids: 75.06

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.70   | pH Units |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0-(01)**  
**1710187-11 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/15/2017 16:21  
Analyzed: 04-Oct-2017 16:32

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017 Final Volume: 1 % Solids: 75.06

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | ND     | mg/kg | U     |

Instrument: APOLLO1

Analyzed: 04-Oct-2017 16:32

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.75 g  
% Solids: 75.06

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.07</b> | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0-(01)**  
**1710187-11 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/15/2017 16:21  
Analyzed: 20-Sep-2017 09:48

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10437 Sample Size: 5 g (wet) Dry Weight: 3.75 g  
Prepared: 20-Sep-2017 Final Volume: 5 g % Solids: 75.06

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 75.2   | %     |       |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0-(01)**  
**1710187-11 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/15/2017 16:21  
Analyzed: 19-Sep-2017 11:45

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BF10390 Sample Size: 1 g (wet) Dry Weight: 0.75 g  
Prepared: 19-Sep-2017 Final Volume: 1 mL % Solids: 75.06

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>75.06</b> | %     |       |





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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0-(01)**  
**1710187-11 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/15/2017 16:21  
Analyzed: 20-Sep-2017 13:07

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.157 g (wet) Dry Weight: 3.87 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 75.06

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.29            | ND     | mg/kg | U     |



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**Reported:**  
06-Oct-2017 14:20

**SO-PTC-207-091517-28.0-30.0-(01)**  
**17I0187-11RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/15/2017 16:21  
Analyzed: 02-Oct-2017 19:40

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 19-Sep-2017 Final Volume: 1 % Solids: 75.06

| Analyte          | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|------------------|------------|----------|-----------------|-------------|-------|-------|
| Inorganic Carbon |            | 1        | 200             | <b>2030</b> | mg/kg |       |

Instrument: APOLLO1

Analyzed: 02-Oct-2017 19:40

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0390  
Prepared: 19-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.75 g  
% Solids: 75.06

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.20</b> | %     |       |



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Reported:  
06-Oct-2017 14:20

**Metals and Metallic Compounds - Quality Control**

**Batch BF10501 - SWC EPA 3050B**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|---------------------------|-------|-------------|---|------|-------------|------|-----------|-------|
| <b>Blank (BF10501-BLK1)</b>       |        |                 |                           |       |             |   |      |             |      |           |       |
|                                   |        |                 |                           |       |             | Prepared: 21-Sep-2017 Analyzed: 23-Sep-2017 10:24 |      |             |      |           |       |
| Aluminum                          | ND     | 0.502           | 5.00                      | mg/kg |             |   |      |             |      |           | U     |
| Arsenic                           | ND     | 0.280           | 5.00                      | mg/kg |             |   |      |             |      |           | U     |
| Iron                              | 0.427  | 0.361           | 5.00                      | mg/kg |             |   |      |             |      |           | J     |
| Manganese                         | ND     | 0.0111          | 0.100                     | mg/kg |             |   |      |             |      |           | U     |
| <b>LCS (BF10501-BS1)</b>          |        |                 |                           |       |             |   |      |             |      |           |       |
|                                   |        |                 |                           |       |             | Prepared: 21-Sep-2017 Analyzed: 23-Sep-2017 10:54 |      |             |      |           |       |
| Aluminum                          | 216    | 0.502           | 5.00                      | mg/kg | 200         |   | 108  | 80-120      |      |           |       |
| Arsenic                           | 208    | 0.280           | 5.00                      | mg/kg | 200         |   | 104  | 80-120      |      |           |       |
| Iron                              | 210    | 0.361           | 5.00                      | mg/kg | 200         |   | 105  | 80-120      |      |           |       |
| Manganese                         | 48.3   | 0.0111          | 0.100                     | mg/kg | 50.0        |   | 96.5 | 80-120      |      |           |       |
| <b>Duplicate (BF10501-DUP1)</b>   |        |                 |                           |       |             |   |      |             |      |           |       |
|                                   |        |                 | <b>Source: 1710187-03</b> |       |             | Prepared: 21-Sep-2017 Analyzed: 23-Sep-2017 11:33 |      |             |      |           |       |
| Aluminum                          | 6320   | 0.620           | 6.18                      | mg/kg |             | 6230  |      |             | 1.48 | 20        |       |
| Arsenic                           | ND     | 0.346           | 6.18                      | mg/kg |             | 0.375   |      |             |      |           | U     |
| Iron                              | 10100  | 0.446           | 6.18                      | mg/kg |             | 10100   |      |             | 0.07 | 20        |       |
| Manganese                         | 60.7   | 0.0137          | 0.124                     | mg/kg |             | 61.2  |      |             | 0.84 | 20        |       |
| <b>Matrix Spike (BF10501-MS1)</b> |        |                 |                           |       |             |   |      |             |      |           |       |
|                                   |        |                 | <b>Source: 1710187-03</b> |       |             | Prepared: 21-Sep-2017 Analyzed: 23-Sep-2017 11:40 |      |             |      |           |       |
| Aluminum                          | 6420   | 0.617           | 6.15                      | mg/kg | 246         | 6230  | 76.3 | 75-125      |      |           |       |
| Arsenic                           | 247    | 0.344           | 6.15                      | mg/kg | 246         | 0.375   | 100  | 75-125      |      |           |       |
| Iron                              | 9170   | 0.443           | 6.15                      | mg/kg | 246         | 10100   | NR   | 75-125      |      |           | HC    |
| Manganese                         | 112    | 0.0136          | 0.123                     | mg/kg | 61.5        | 61.2  | 82.8 | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
06-Oct-2017 14:20

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0396 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0396-BLK1)</b> |        |                 |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 13:43 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0140          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Barium                      | ND     | 0.0075          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |
| Cadmium                     | 0.0013 | 0.0006          | 0.0100          | mg/L  |             |   |      |             |     |           | J     |
| Chromium                    | ND     | 0.0024          | 0.0250          | mg/L  |             |   |      |             |     |           | U     |
| Lead                        | ND     | 0.0065          | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| Selenium                    | ND     | 0.0408          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Silver                      | ND     | 0.0022          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |



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**Reported:**  
06-Oct-2017 14:20

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0398 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0398-BLK1)</b> |        |                 |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 16:09 |      |             |     |           |       |
| Mercury                     | ND     | 0.000007        | 0.000100        | mg/L  |             |   |      |             |     |           | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 14:20

Wet Chemistry - Quality Control

Batch BFI0356 - MSA 24-5.3

Instrument: DX500 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units   | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|---|---------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFI0356-BLK1)</b>       |        | Prepared: 18-Sep-2017 Analyzed: 18-Sep-2017 14:14 |         |   |               |      |             |      |           |       |
| Orthophosphorus                   | ND     | 1.00  | mg-P/kg |   |               |      |             |      |           | U     |
| Sulfate                           | ND     | 1.00  | mg/kg   |   |               |      |             |      |           | U     |
| <b>LCS (BFI0356-BS1)</b>          |        | Prepared: 18-Sep-2017 Analyzed: 18-Sep-2017 14:31 |         |   |               |      |             |      |           |       |
| Orthophosphorus                   | 102    | 5.00  | mg-P/kg | 100   |               | 102  | 75-125      |      |           | D     |
| Sulfate                           | 103    | 5.00  | mg/kg   | 100   |               | 103  | 75-125      |      |           | D     |
| <b>Duplicate (BFI0356-DUP1)</b>   |        | <b>Source: 17I0187-03</b>                         |         | Prepared: 18-Sep-2017 Analyzed: 18-Sep-2017 15:21 |               |      |             |      |           |       |
| Orthophosphorus                   | ND     | 11.0  | mg-P/kg |   | ND            |      |             |      |           | U     |
| Sulfate                           | 242    | 11.0  | mg/kg   |   | 259           |      |             | 6.99 | 20        | D     |
| <b>Matrix Spike (BFI0356-MS1)</b> |        | <b>Source: 17I0187-03</b>                         |         | Prepared: 18-Sep-2017 Analyzed: 18-Sep-2017 15:38 |               |      |             |      |           |       |
| Orthophosphorus                   | 98.6   | 10.9  | mg-P/kg | 109   | ND            | 90.8 | 75-125      |      |           | D     |
| Sulfate                           | 355    | 10.9  | mg/kg   | 109   | 259           | 88.6 | 75-125      |      |           | D     |

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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 14:20

Wet Chemistry - Quality Control

Batch BFI0390 - PSEP 1986 (modified)

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte   | Result | Reporting Limit | Units | Spike Level   | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|--------|-----------------|-------|---|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFI0390-BLK1)</b>   |        |                 |       | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 11:45                       |               |      |             |       |           |       |
| Total Solids  | ND     | 0.04            | %     |   |               |      |             |       |           | U     |
| <b>Blank (BFI0390-BLK2)</b>   |        |                 |       | Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 14:24                       |               |      |             |       |           |       |
| Total Carbon  | ND     | 0.02            | %     |   |               |      |             |       |           | U     |
| <b>Blank (BFI0390-BLK3)</b>   |        |                 |       | Prepared: 19-Sep-2017 Analyzed: 04-Oct-2017 08:29                       |               |      |             |       |           |       |
| Total Organic Carbon  | ND     | 0.02            | %     |   |               |      |             |       |           | U     |
| <b>Duplicate (BFI0390-DUP4)</b>   |        |                 |       | Source: 17I0187-03RE1 Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 18:20 |               |      |             |       |           |       |
| Total Carbon  | 0.10   | 0.02            | %     |   | 0.23          |      |             | 82.20 | 20        | *     |
| Total Solids  | 79.10  | 0.04            | %     |   | 78.26         |      |             | 1.06  | 20        |       |
| <b>Duplicate (BFI0390-DUP5)</b>   |        |                 |       | Source: 17I0187-03RE1 Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 18:26 |               |      |             |       |           |       |
| Total Carbon  | 0.10   | 0.02            | %     |   | 0.23          |      |             | 81.60 | 20        | *     |
| <b>Duplicate (BFI0390-DUP6)</b>   |        |                 |       | Source: 17I0187-03RE1 Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 18:37 |               |      |             |       |           |       |
| Total Carbon  | 0.10   | 0.02            | %     |   | 0.23          |      |             | 74.70 | 20        | *     |
| <b>Duplicate (BFI0390-DUP7)</b>   |        |                 |       | Source: 17I0187-03RE1 Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 18:41 |               |      |             |       |           |       |
| Total Carbon  | 0.09   | 0.02            | %     |   | 0.23          |      |             | 87.90 | 20        | *     |
| <b>Duplicate (BFI0390-DUPD)</b>   |        |                 |       | Source: 17I0187-03 Prepared: 19-Sep-2017 Analyzed: 04-Oct-2017 15:45    |               |      |             |       |           |       |
| Total Organic Carbon  | 0.06   | 0.02            | %     |   | 0.16          |      |             | 91.60 | 20        | *     |
| <b>Duplicate (BFI0390-DUPE)</b>   |        |                 |       | Source: 17I0187-03 Prepared: 19-Sep-2017 Analyzed: 04-Oct-2017 15:52    |               |      |             |       |           |       |
| Total Organic Carbon  | 0.06   | 0.02            | %     |   | 0.16          |      |             | 92.40 | 20        | *     |
| <b>DL (BFI0390-MS3)</b>   |        |                 |       | Source: 17I0187-03RE1 Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 18:53 |               |      |             |       |           |       |
| Total Carbon  | 1.71   | 0.02            | %     | 1.14  | 0.23          | 130  | 75-125      |       |           | *     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |                 |       |   |               |      |             |       |           |       |
| <b>Matrix Spike (BFI0390-MS7)</b>   |        |                 |       | Source: 17I0187-03 Prepared: 19-Sep-2017 Analyzed: 04-Oct-2017 16:13    |               |      |             |       |           |       |
| Total Organic Carbon  | 1.25   | 0.02            | %     | 1.07  | 0.16          | 102  | 75-125      |       |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |                 |       |   |               |      |             |       |           |       |
| <b>Reference (BFI0390-SRM1)</b>   |        |                 |       | Prepared: 19-Sep-2017 Analyzed: 04-Oct-2017 08:52                       |               |      |             |       |           |       |
| Total Organic Carbon  | 2.08   | 0.02            | %     | 2.45  |               | 85.1 | 75-125      |       |           |       |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>06-Oct-2017 14:20 |
|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFI0390 - PSEP 1986 (modified)**

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Reference (BFI0390-SRM2)</b> |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 02-Oct-2017 19:49 |      |             |     |           |       |
| Total Carbon                    | 3.03   | 0.02            | %     | 3.35        |   | 90.4 | 80-120      |     |           |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

**Wet Chemistry - Quality Control**

**Batch BFI0401 - PSEP 1986**

Instrument: UV1800-1 Analyst: GM

| QC Sample/Analyte                 | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0401-BLK1)</b>       |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 12:35                    |      |             |     |           |       |
| Sulfide                           | ND     | 1.00            | mg/kg |             |  |      |             |     |           | U     |
| <b>LCS (BFI0401-BS1)</b>          |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 12:35                    |      |             |     |           |       |
| Sulfide                           | 123    | 10.0            | mg/kg | 159         |  | 77.5 | 75-125      |     |           | D     |
| <b>Duplicate (BFI0401-DUP2)</b>   |        |                 |       |             | Source: 17I0187-03 Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 13:05 |      |             |     |           |       |
| Sulfide                           | ND     | 1.17            | mg/kg |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BFI0401-MS2)</b> |        |                 |       |             | Source: 17I0187-03 Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 13:05 |      |             |     |           |       |
| Sulfide                           | 155    | 12.5            | mg/kg | 198         | ND   | 78.4 | 75-125      |     |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

**Wet Chemistry - Quality Control**

**Batch BFI0402 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0402-BLK1)</b> |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 12:28 |      |             |     |           |       |
| Total Solids                | ND     | 0.04            | %     |             |   |      |             |     |           | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

**Wet Chemistry - Quality Control**

**Batch BFI0437 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFI0437-BLK1)</b>     |        |                 |       |             | Prepared: 20-Sep-2017 Analyzed: 20-Sep-2017 09:48                    |      |             |      |           |       |
| Total Solids, Sulfide           | ND     | 0.040           | %     |             |  |      |             |      |           | U     |
| <b>Duplicate (BFI0437-DUP1)</b> |        |                 |       |             | Source: 17I0187-03 Prepared: 20-Sep-2017 Analyzed: 20-Sep-2017 09:48 |      |             |      |           |       |
| Total Solids, Sulfide           | 78.7   | 0.040           | %     |             | 78.7   |      |             | 0.12 | 20        |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

**Wet Chemistry - Quality Control**

**Batch BFI0615 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFI0615-BLK1)</b>     |        |                 |       |             | Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 14:16                    |      |             |      |           |       |
| Total Solids                    | ND     | 0.04            | %     |             |  |      |             |      |           | U     |
| <b>Duplicate (BFI0615-DUP1)</b> |        |                 |       |             | Source: 17I0187-02 Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 14:16 |      |             |      |           |       |
| Total Solids                    | 66.67  | 0.04            | %     |             | 66.50  |      |             | 0.26 | 20        |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

**Wet Chemistry - Quality Control**

**Batch BFI0618 - EPA 9045D**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte        | Result | Reporting Limit | Units    | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|--------------------------|--------|-----------------|----------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>LCS (BFI0618-BS1)</b> |        |                 |          |             |               | Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08 |             |     |           |       |
| pH                       | 7.00   | 0.01            | pH Units | 7.00        |               | 100   | 0-200       |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

**Wet Chemistry - Quality Control**

**Batch BFI0726 - EPA 9045D**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte        | Result | Reporting Limit | Units    | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|--------------------------|--------|-----------------|----------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>LCS (BFI0726-BS1)</b> |        |                 |          |             |               | Prepared: 28-Sep-2017 Analyzed: 29-Sep-2017 12:02 |             |     |           |       |
| pH                       | 7.00   | 0.01            | pH Units | 7.00        |               | 100   | 0-200       |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
06-Oct-2017 14:20

**Certified Analyses included in this Report**

| Analyte                         | Certifications             |
|---------------------------------|----------------------------|
| <b>EPA 300.0 in Solid</b>       |                            |
| Orthophosphorus                 | DoD-ELAP,WA-DW,WADOE,NELAP |
| Sulfate                         | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 6010C in Solid</b>       |                            |
| Aluminum                        | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | NELAP,WADOE,DoD-ELAP,ADEC  |
| Iron                            | NELAP,WADOE,DoD-ELAP       |
| Manganese                       | NELAP,WADOE,DoD-ELAP       |
| Silver                          | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | CALAP,NELAP,WADOE          |
| Barium                          | CALAP,NELAP,WADOE          |
| Cadmium                         | NELAP,WADOE,DoD-ELAP       |
| Chromium                        | NELAP,WADOE,DoD-ELAP       |
| Lead                            | NELAP,WADOE,DoD-ELAP       |
| Selenium                        | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 7470A in Solid</b>       |                            |
| Mercury                         | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b>       |                            |
| pH                              | WADOE,CALAP,DoD-ELAP,NELAP |
| <b>EPA 9060A m in Solid</b>     |                            |
| Total Organic Carbon            | WADOE                      |
| <b>SM 4500-S2 D-00 in Solid</b> |                            |
| Sulfide                         | DoD-ELAP,NELAP,WADOE       |

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
06-Oct-2017 14:20

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- D The reported value is from a dilution
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.





09 October 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

1710208

Associated SDG ID(s)

N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 1710208  
 Turn-around Requested: Normal  
 ARI Client Company: Pioneer Technologies  
 Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: DG Cooper 206-660-3466 / Likner

Date: 9/18/17  
 Page: 2 of 2  
 No. of Coolers: 2  
 Cooler Temps:  
 Analysis Requested



Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)

| Sample ID                              | Date               | Time             | Matrix          | No. Containers              | Analysis Requested               |  |  |                               |  |                           |                             |   | Notes/Comments |
|--|--------------------|------------------|-----------------|-----------------------------|----------------------------------|--|--|-------------------------------|--|---------------------------|-----------------------------|---|----------------|
|  |                    |                  |                 |                             | Total Arsenic<br>EPA 3050B/6010C | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Ag | EPA 1311/6010C/7470A<br>pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 3050B/6010C | Sulfate, Ortho-phosphorus<br>EPA 300.0 | TOC, TIC<br>EPA 9060A Mod | Sulfide<br>SM 4500-S2(PSEP) |   |                |
| <del>30-PTC-111-091817-37.3-39.5</del> | <del>9/18/17</del> | <del>14:30</del> | <del>Soil</del> | <del>1-16oz<br/>1-2oz</del> | X                                | X  | X                                      | X                             | X                                      | X                         | X                           | X |                |
| 30-PTC-111-091817-37.3-39.5            | 9/18/17            | 14:30            | Soil            | 1-16oz                      | X                                | X  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |
|  |                    |                  |                 |                             |                                  |  |  |                               |  |                           |                             |   |                |

|   |   |  |
|---|---|--|
| Comments/Special Instructions<br>Sulfides preserved w/ZnAc<br>Submit EDD to PIONEER using<br>PIONEER EDD format<br>Bill to Port of Tacoma<br>PO#79227 | Relinquished by:<br>(Signature)<br>Printed Name: Lucas Kerner<br>Company: DOF | Received by:<br>(Signature)<br>Printed Name: Shelly L Fisher<br>Company: ARI |
|   | Date & Time: 9/18/17 1620   | Date & Time: 9/18/17 1620  |

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.  
 Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: **1710208**  
 Turn-around Requested: **Normal**  
 Date: **9/18/17**  
 Page: **1** of **2**  
 No. of Coolers: **1**  
 Cooler Temps:

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Client Company: **Pioneer Technologies**  
 Phone: **360-570-1700**  
 Client Contact: **Troy Bussey (busseyt@uspioneer.com)**  
 Client Project Name: **Arkema FS DG Inv**  
 Client Project #: **79227**

Analysis Requested:  
 Total Arsenic EPA 3050B/6010C  
 TCLP Metals As, Ba, Cd, Cr, Pb, Hg, Se, Ag EPA 1311/6010C/7470A  
 pH EPA 9045  
 Fe, Al, Mn EPA 3050B/6010C  
 Sulfate, Ortho-phosphorus EPA 300.0  
 TOC, TIC EPA 9060A Mod  
 Sulfide SM 4500-S2(PSEP)

| Sample ID                        | Date    | Time  | Matrix | No. Containers  | Notes/Comments |
|----------------------------------|---------|-------|--------|-----------------|----------------|
| 50-PTC-121-091817-11.0-13.0      | 9/18/17 | 11:50 | 501L   | 1-16oz<br>1-2oz | X              |
| 50-PTC-121-091817-11.0-13.0-(10) | 9/18/17 | 11:50 | 501L   | 1-4oz           | X              |
| 50-PTC-121-091817-13.1-15.0      | 9/18/17 | 11:00 | 501L   | 1-16oz          | X              |
| 50-PTC-121-091817-13.1-15.0-(10) | 9/18/17 | 11:00 | 501L   | 1-16oz<br>1-2oz | X              |
| 50-PTC-121-091817-22.0-24.0      | 9/18/17 | 12:00 | 501L   | 1-16oz          | X              |
| 50-PTC-121-091817-30.0-32.0      | 9/18/17 | 10:25 | 501L   | 1-16oz          | X              |
| 50-PTC-111-091817-6.0-9.0        | 9/19/17 | 15:00 | 501L   | 1-16oz<br>1-2oz | X              |
| 50-PTC-111-091817-6.0-8.0-(10)   | 9/19/17 | 15:00 | 501L   | 2oz-1           | X              |
| 50-PTC-111-091817-13.1-15.0      | 9/19/17 | 14:20 | 501L   | 1-16oz          | X              |
| 50-PTC-111-091817-13.1-15.0-(10) | 9/19/17 | 14:20 | 501L   | 1-16oz          | X              |
| 50-PTC-111-091817-20.0-22.0      | 9/18/17 | 15:10 | 501L   | 1-16oz<br>1-2oz | X              |

Comments/Special Instructions: **Sulfides preserved w/ZnAc**  
**Submit EDD to PIONEER using PIONEER EDD format**  
**Bill to Port of Tacoma PO#79227**

Relinquished by: **[Signature]**  
 Printed Name: **Lucas Kover**  
 Company: **ARI**

Received by: **[Signature]**  
 (Signature) Printed Name: **Shelly Fisher**  
 Company: **ARI**

Date & Time: **9/18/17 16:20**

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Cooler Receipt Form

ARI Client: Pioneer/DOF

Project Name: \_\_\_\_\_

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17I0208

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) Time: 1620 5.4

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005206

Cooler Accepted by: [Signature] Date: 9/18/17 Time: 1620

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO  BF 9/19

Were all VOC vials free of air bubbles? ..... NA  YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI ..... NA

Was Sample Split by ARI :  YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: BF Date: 9/19/17 Time: 832

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle              | Sample ID on COC               | Sample ID on Bottle | Sample ID on COC |
|----------------------------------|--------------------------------|---------------------|------------------|
| <u>202 jar SO-PTC-III-091817</u> | <u>SO-PTC-III-091817-60-80</u> | <u>fg</u>           |                  |
|                                  |                                | <u>BF</u>           |                  |
|                                  |                                |                     |                  |
|                                  |                                |                     |                  |

Additional Notes, Discrepancies, & Resolutions:

By: BF Date: 9/19/17

|                                    |                              |  |  |
|------------------------------------|------------------------------|--|--|
| <p>Small Air Bubbles<br/>- 2mm</p> | <p>Peabubbles<br/>2-4 mm</p> | <p>LARGE Air Bubbles<br/>&gt; 4 mm</p> | <p>Small → "sm" (&lt; 2 mm)</p> <p>Peabubbles → "pb" (2 to &lt; 4 mm)</p> <p>Large → "lg" (4 to &lt; 6 mm)</p> <p>Headspace → "hs" (&gt; 6 mm)</p> |
|------------------------------------|------------------------------|--|--|



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 13:59

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-121-091817-11.0-13.0      | 17I0208-01    | Solid  | 18-Sep-2017 11:50 | 18-Sep-2017 16:20 |
| SO-PTC-121-091817-11.0-13.0-(10) | 17I0208-02    | Solid  | 18-Sep-2017 11:50 | 18-Sep-2017 16:20 |
| SO-PTC-121-091817-13.1-15.0      | 17I0208-03    | Solid  | 18-Sep-2017 11:00 | 18-Sep-2017 16:20 |
| SO-PTC-121-091817-13.1-15.0-(10) | 17I0208-04    | Solid  | 18-Sep-2017 11:00 | 18-Sep-2017 16:20 |
| SO-PTC-121-091817-22.0-24.0      | 17I0208-05    | Solid  | 18-Sep-2017 12:00 | 18-Sep-2017 16:20 |
| SO-PTC-121-091817-36.0-38.0      | 17I0208-06    | Solid  | 18-Sep-2017 10:25 | 18-Sep-2017 16:20 |
| SO-PTC-111-091817-6.0-8.0        | 17I0208-07    | Solid  | 18-Sep-2017 15:00 | 18-Sep-2017 16:20 |
| SO-PTC-111-091817-6.0-8.0-(10)   | 17I0208-08    | Solid  | 18-Sep-2017 15:00 | 18-Sep-2017 16:20 |
| SO-PTC-111-091817-13.1-15.0      | 17I0208-09    | Solid  | 18-Sep-2017 14:20 | 18-Sep-2017 16:20 |
| SO-PTC-111-091817-13.1-15.0-(10) | 17I0208-10    | Solid  | 18-Sep-2017 14:20 | 18-Sep-2017 16:20 |
| SO-PTC-111-091817-20.0-22.0      | 17I0208-11    | Solid  | 18-Sep-2017 15:10 | 18-Sep-2017 16:20 |
| SO-PTC-111-091817-37.3-39.5      | 17I0208-12    | Solid  | 18-Sep-2017 14:30 | 18-Sep-2017 16:20 |



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09-Oct-2017 13:59

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 18, 2017 under ARI workorder 1710208. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total and TCLP Metals - EPA Methods 6010C and 7471B

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0501 (total) has Iron detected below the reporting limits, but above the method detection limits. The Iron has been flagged with a "J" qualifier on the associated method blank. No further corrective action was taken. Method blank BFI0756 (tclp) has Mercury detected below the reporting limit, but above the method detection limit. The Mercury has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-111-091817-6.0-8.0-(10) (tclp). The matrix spike percent recoveries were within QC limits. The duplicate has a Chromium concentration  $\leq 5$  times the reporting limit, and the replicate control limit defaults to  $\pm$  the reporting limit instead of 20% of the RPD. The Chromium has been flagged with an "L" qualifier on the duplicate. No further corrective action was taken.

### Anions - EPA 300.0

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0395 has Sulfate detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. no further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-121-091817-11.0-13.0, and the reanalysis. The duplicate RPD were within QC limits. The matrix spike has no spike recovery for orthophosphorus. This is likely due to matrix interference. A post spike digest was prepared with orthophosphorus within QC limits, and was not spike for Sulfate. No further corrective action was taken.

### pH - EPA Method 9045A

The samples were prepared and analyzed within the recommended holding times.

The LCS percent recoveries were within control limits.



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Reported:  
09-Oct-2017 13:59

A duplicate was prepared in conjunction with sample SO-PTC-121-091817-11.0-13.0. The duplicate RPD was within QC limits.

#### **Total Organic and Inorganic Carbon - EPA Method 9060A**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.

#### **Sulfide - Method SM4500**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0**  
**1710208-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 11:50  
Analyzed: 23-Sep-2017 12:20

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.03 g (wet) Dry Weight: 0.65 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 62.85

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.776           | 7.72            | <b>13300</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.433           | 7.72            | <b>2140</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.557           | 7.72            | <b>16600</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0171          | 0.154           | <b>90.1</b>  | mg/kg |       |





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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0**  
**1710208-01 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/18/2017 11:50  
Analyzed: 19-Sep-2017 16:31

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10395 Sample Size: 4.17 g (wet) Dry Weight: 2.62 g  
Prepared: 19-Sep-2017 Final Volume: 40 mL % Solids: 62.85

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 7.63            | ND     | mg-P/kg | U     |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0**  
**1710208-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2017 11:50

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.13 g (wet)

Final Volume: 40.27 mL

Dry Weight: 12.65 g

% Solids: 62.85

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>5.28</b> | pH Units |       |



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09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0**  
**1710208-01 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/18/2017 11:50  
Analyzed: 06-Oct-2017 10:18

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 62.85

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.430</b> | %     |       |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 10:35

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.63 g  
% Solids: 62.85

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>2.26</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>1.83</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0**  
**1710208-01 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/18/2017 11:50  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 3.14 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 62.85

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 73.7   | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0**  
**1710208-01 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/18/2017 11:50  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.63 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 62.85

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>62.85</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0**  
**1710208-01 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/18/2017 11:50  
Analyzed: 20-Sep-2017 13:30

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.398 g (wet) Dry Weight: 3.39 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 62.85

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.47            | <b>3.12</b> | mg/kg |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0**  
**17I0208-01RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/18/2017 11:50  
Analyzed: 20-Sep-2017 16:50

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10450 Sample Size: 4.17 g (wet) Dry Weight: 2.62 g  
Prepared: 19-Sep-2017 Final Volume: 40 mL % Solids: 62.85

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 7.63            | <b>96.1</b> | mg/kg | D     |



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Reported:  
09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0-(10)**  
**1710208-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 11:50  
Analyzed: 02-Oct-2017 18:18

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>5.87</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0228</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0079</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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09-Oct-2017 13:59

**SO-PTC-121-091817-11.0-13.0-(10)**  
**1710208-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/18/2017 11:50  
Analyzed: 02-Oct-2017 13:11

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000050</b> | mg/L  | J     |



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09-Oct-2017 13:59

**SO-PTC-121-091817-13.1-15.0**  
**1710208-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 11:00  
Analyzed: 23-Sep-2017 12:23

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.014 g (wet) Dry Weight: 0.72 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 70.79

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.390           | 6.97            | <b>1130</b> | mg/kg |       |



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09-Oct-2017 13:59

**SO-PTC-121-091817-13.1-15.0**  
**1710208-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 09/18/2017 11:00  
Analyzed: 27-Sep-2017 13:08

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFI0616 Sample Size: 20.01 g (wet) Dry Weight: 14.16 g  
Prepared: 25-Sep-2017 Final Volume: 39.35 mL % Solids: 70.79

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.03</b> | pH Units |       |



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09-Oct-2017 13:59

**SO-PTC-121-091817-13.1-15.0**  
**1710208-03 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/18/2017 11:00  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 7.08 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 70.79

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>70.79</b> | %     |       |



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09-Oct-2017 13:59

**SO-PTC-121-091817-13.1-15.0-(10)**  
**1710208-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 11:00  
Analyzed: 03-Oct-2017 15:47

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>10.4</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0212</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0055</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
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**SO-PTC-121-091817-13.1-15.0-(10)**  
**1710208-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/18/2017 11:00  
Analyzed: 02-Oct-2017 13:13

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000060</b> | mg/L  | J     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 13:59

**SO-PTC-121-091817-22.0-24.0**  
**1710208-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 12:00  
Analyzed: 23-Sep-2017 12:27

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.033 g (wet) Dry Weight: 0.80 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 77.80

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.625           | 6.22            | <b>5830</b>  | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.349           | 6.22            | <b>37.6</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.449           | 6.22            | <b>10800</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0138          | 0.124           | <b>76.2</b>  | mg/kg |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-22.0-24.0**  
**1710208-05 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/18/2017 12:00  
Analyzed: 19-Sep-2017 17:21

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10395 Sample Size: 4.19 g (wet) Dry Weight: 3.26 g  
Prepared: 19-Sep-2017 Final Volume: 40 mL % Solids: 77.80

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 6.14            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 6.14            | <b>36.1</b> | mg/kg | D, B  |





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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-22.0-24.0**  
**1710208-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2017 12:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.33 g (wet)

Final Volume: 40.39 mL

Dry Weight: 15.82 g

% Solids: 77.80

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.38   | pH Units |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-22.0-24.0**  
**1710208-05 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/18/2017 12:00  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 3.89 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 77.80

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 77.3   | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-22.0-24.0**  
**1710208-05 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/18/2017 12:00  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.78 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 77.80

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>77.80</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-22.0-24.0**  
**1710208-05 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/18/2017 12:00  
Analyzed: 20-Sep-2017 13:30

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.241 g (wet) Dry Weight: 4.08 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 77.80

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.23            | ND     | mg/kg | U     |



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Project Number: 79227  
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Reported:  
09-Oct-2017 13:59

**SO-PTC-121-091817-22.0-24.0**  
**17I0208-05RE3 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/18/2017 12:00  
Analyzed: 06-Oct-2017 10:38

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 77.80

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | ND     | %     | U     |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 11:48

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.78 g  
% Solids: 77.80

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.06</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.05</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-36.0-38.0**  
**1710208-06 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 10:25  
Analyzed: 23-Sep-2017 10:28

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.075 g (wet) Dry Weight: 0.71 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 66.20

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.394           | 7.03            | <b>4.09</b> | mg/kg | J     |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-36.0-38.0**  
**1710208-06 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2017 10:25

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.1 g (wet)

Final Volume: 40.39 mL

Dry Weight: 13.31 g

% Solids: 66.20

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.59   | pH Units |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-121-091817-36.0-38.0**  
**1710208-06 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/18/2017 10:25  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 6.62 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 66.20

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>66.20</b> | %     |       |





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Reported:  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0**  
**1710208-07 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 15:00  
Analyzed: 23-Sep-2017 10:31

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.002 g (wet) Dry Weight: 0.83 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 82.43

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.608           | 6.05            | <b>9740</b>  | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.339           | 6.05            | <b>955</b>   | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.437           | 6.05            | <b>10500</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0134          | 0.121           | <b>78.7</b>  | mg/kg |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0**  
**1710208-07 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/18/2017 15:00  
Analyzed: 19-Sep-2017 17:38

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10395 Sample Size: 4.24 g (wet) Dry Weight: 3.50 g  
Prepared: 19-Sep-2017 Final Volume: 40 mL % Solids: 82.43

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 5.72            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 5.72            | <b>35.0</b> | mg/kg | D, B  |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0**  
**1710208-07 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2017 15:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.25 g (wet)

Final Volume: 40.19 mL

Dry Weight: 16.69 g

% Solids: 82.43

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.66   | pH Units |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0**  
**1710208-07 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/18/2017 15:00  
Analyzed: 06-Oct-2017 10:59

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017

Final Volume: 1 % Solids: 82.43

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | ND     | %     | U     |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 12:05

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017

Sample Size: 1 g (wet) Dry Weight: 0.82 g  
Final Volume: 1 mL % Solids: 82.43

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.06</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.07</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0**  
**1710208-07 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/18/2017 15:00  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 4.12 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 82.43

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>78.7</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0**  
**1710208-07 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/18/2017 15:00  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.82 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 82.43

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>82.43</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0**  
**1710208-07 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/18/2017 15:00  
Analyzed: 20-Sep-2017 13:30

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.277 g (wet) Dry Weight: 4.35 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 82.43

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.15            | ND     | mg/kg | U     |



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Olympia WA, 98503

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Reported:  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0-(10)**  
**1710208-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 15:00  
Analyzed: 02-Oct-2017 18:09

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BF10755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.436</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0205</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0032</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |





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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-6.0-8.0-(10)**  
**1710208-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/18/2017 15:00  
Analyzed: 02-Oct-2017 13:15

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000050</b> | mg/L  | J     |



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Project Number: 79227  
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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-13.1-15.0**  
**1710208-09 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 14:20  
Analyzed: 25-Sep-2017 18:11

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.024 g (wet) Dry Weight: 0.41 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 39.91

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.71            | 30.6            | <b>10200</b> | mg/kg | D     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-13.1-15.0**  
**1710208-09 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 09/18/2017 14:20  
Analyzed: 27-Sep-2017 13:08

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFI0616 Sample Size: 20.07 g (wet) Dry Weight: 8.01 g  
Prepared: 25-Sep-2017 Final Volume: 39.87 mL % Solids: 39.91

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.54</b> | pH Units |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-13.1-15.0**  
**1710208-09 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/18/2017 14:20  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 3.99 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 39.91

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>39.91</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 13:59

**SO-PTC-111-091817-13.1-15.0-(10)**  
**1710208-10 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 14:20  
Analyzed: 03-Oct-2017 16:29

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 20       | 0.0560          | 1.00            | <b>72.3</b>   | mg/L  | D     |
| Barium   | 7440-39-3  | 20       | 0.0299          | 0.0600          | ND            | mg/L  | U     |
| Cadmium  | 7440-43-9  | 20       | 0.0025          | 0.0400          | <b>0.0244</b> | mg/L  | J, D  |
| Chromium | 7440-47-3  | 20       | 0.0094          | 0.100           | <b>0.0238</b> | mg/L  | J, D  |
| Lead     | 7439-92-1  | 20       | 0.0261          | 0.400           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 20       | 0.163           | 1.00            | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 20       | 0.0088          | 0.0600          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-13.1-15.0-(10)**  
**1710208-10 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/18/2017 14:20  
Analyzed: 02-Oct-2017 13:19

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000080</b> | mg/L  | J     |



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Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 13:59

**SO-PTC-111-091817-20.0-22.0**  
**1710208-11 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 15:10  
Analyzed: 23-Sep-2017 10:39

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.031 g (wet) Dry Weight: 0.84 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 81.10

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.601           | 5.98            | <b>8770</b> | mg/kg |       |
| Arsenic   | 7440-38-2  | 2        | 0.335           | 5.98            | <b>39.4</b> | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.431           | 5.98            | <b>8500</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0132          | 0.120           | <b>59.6</b> | mg/kg |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-20.0-22.0**  
**1710208-11 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/18/2017 15:10  
Analyzed: 19-Sep-2017 17:55

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10395 Sample Size: 4.12 g (wet) Dry Weight: 3.34 g  
Prepared: 19-Sep-2017 Final Volume: 40 mL % Solids: 81.10

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 5.99            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 5.99            | 37.1   | mg/kg | D, B  |





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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-20.0-22.0**  
**1710208-11 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2017 15:10

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.17 g (wet)

Final Volume: 40.02 mL

Dry Weight: 16.36 g

% Solids: 81.10

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>7.08</b> | pH Units |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-20.0-22.0**  
**1710208-11 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/18/2017 15:10  
Analyzed: 06-Oct-2017 11:09

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 81.10

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0459</b> | %     |       |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 12:26

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.81 g  
% Solids: 81.10

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.35</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.31</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-20.0-22.0**  
**1710208-11 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/18/2017 15:10  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 4.06 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 81.10

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>78.2</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-20.0-22.0**  
**1710208-11 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/18/2017 15:10  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.81 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 81.10

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>81.10</b> | %     |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-20.0-22.0**  
**1710208-11 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/18/2017 15:10  
Analyzed: 20-Sep-2017 13:31

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10401 Sample Size: 5.432 g (wet) Dry Weight: 4.41 g  
Prepared: 19-Sep-2017 Final Volume: 100 mL % Solids: 81.10

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.13            | <b>3.47</b> | mg/kg |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-37.3-39.5**  
**1710208-12 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/18/2017 14:30  
Analyzed: 23-Sep-2017 11:06

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10501 Sample Size: 1.014 g (wet) Dry Weight: 0.59 g  
Prepared: 21-Sep-2017 Final Volume: 50 mL % Solids: 58.51

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.472           | 8.43            | <b>4.03</b> | mg/kg | J     |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-37.3-39.5**  
**1710208-12 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/18/2017 14:30

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.31 g (wet)

Final Volume: 40.21 mL

Dry Weight: 11.88 g

% Solids: 58.51

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.15   | pH Units |       |



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**Reported:**  
09-Oct-2017 13:59

**SO-PTC-111-091817-37.3-39.5**  
**1710208-12 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/18/2017 14:30  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 5.85 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 58.51

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>58.51</b> | %     |       |





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**Reported:**  
09-Oct-2017 13:59

**Metals and Metallic Compounds - Quality Control**

**Batch BFI0501 - SWC EPA 3050B**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0501-BLK1)</b> |        |                 |                 |       |             | Prepared: 21-Sep-2017 Analyzed: 23-Sep-2017 10:24 |      |             |     |           |       |
| Aluminum                    | ND     | 0.502           | 5.00            | mg/kg |             |   |      |             |     |           | U     |
| Arsenic                     | ND     | 0.280           | 5.00            | mg/kg |             |   |      |             |     |           | U     |
| Iron                        | 0.427  | 0.361           | 5.00            | mg/kg |             |   |      |             |     |           | J     |
| Manganese                   | ND     | 0.0111          | 0.100           | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BFI0501-BS1)</b>    |        |                 |                 |       |             | Prepared: 21-Sep-2017 Analyzed: 23-Sep-2017 10:54 |      |             |     |           |       |
| Aluminum                    | 216    | 0.502           | 5.00            | mg/kg | 200         |   | 108  | 80-120      |     |           |       |
| Arsenic                     | 208    | 0.280           | 5.00            | mg/kg | 200         |   | 104  | 80-120      |     |           |       |
| Iron                        | 210    | 0.361           | 5.00            | mg/kg | 200         |   | 105  | 80-120      |     |           |       |
| Manganese                   | 48.3   | 0.0111          | 0.100           | mg/kg | 50.0        |   | 96.5 | 80-120      |     |           |       |



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Reported:  
09-Oct-2017 13:59

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BF10755 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte                 | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|--------------------|-------|-------------|---|------|-------------|-------|-----------|-------|
| <b>Blank (BF10755-BLK1)</b>       |        |                 |                    |       |             |   |      |             |       |           |       |
|                                   |        |                 |                    |       |             | Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 18:01 |      |             |       |           |       |
| Arsenic                           | ND     | 0.0140          | 0.250              | mg/L  |             |   |      |             |       |           | U     |
| Barium                            | ND     | 0.0075          | 0.0150             | mg/L  |             |   |      |             |       |           | U     |
| Cadmium                           | ND     | 0.0006          | 0.0100             | mg/L  |             |   |      |             |       |           | U     |
| Chromium                          | 0.0055 | 0.0024          | 0.0250             | mg/L  |             |   |      |             |       |           | J     |
| Lead                              | ND     | 0.0065          | 0.100              | mg/L  |             |   |      |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250              | mg/L  |             |   |      |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150             | mg/L  |             |   |      |             |       |           | U     |
| <b>Duplicate (BF10755-DUP1)</b>   |        |                 |                    |       |             |   |      |             |       |           |       |
|                                   |        |                 | Source: 1710208-08 |       |             | Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 18:05 |      |             |       |           |       |
| Arsenic                           | 0.449  | 0.0140          | 0.250              | mg/L  |             | 0.436   |      |             | 2.82  | 20        |       |
| Barium                            | 0.0199 | 0.0075          | 0.0150             | mg/L  |             | 0.0205  |      |             | 3.21  | 20        |       |
| Cadmium                           | ND     | 0.0006          | 0.0100             | mg/L  |             | ND  |      |             |       |           | U     |
| Chromium                          | 0.0050 | 0.0024          | 0.0250             | mg/L  |             | 0.0032  |      |             | 44.80 | 20        | L, J  |
| Lead                              | ND     | 0.0065          | 0.100              | mg/L  |             | ND  |      |             |       |           | U     |
| Selenium                          | ND     | 0.0408          | 0.250              | mg/L  |             | ND  |      |             |       |           | U     |
| Silver                            | ND     | 0.0022          | 0.0150             | mg/L  |             | ND  |      |             |       |           | U     |
| <b>Matrix Spike (BF10755-MS1)</b> |        |                 |                    |       |             |   |      |             |       |           |       |
|                                   |        |                 | Source: 1710208-08 |       |             | Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 18:13 |      |             |       |           |       |
| Arsenic                           | 4.73   | 0.0140          | 0.250              | mg/L  | 4.00        | 0.436   | 107  | 75-125      |       |           |       |
| Barium                            | 4.29   | 0.0075          | 0.0150             | mg/L  | 4.00        | 0.0205  | 107  | 75-125      |       |           |       |
| Cadmium                           | 1.03   | 0.0006          | 0.0100             | mg/L  | 1.00        | ND  | 103  | 75-125      |       |           |       |
| Chromium                          | 1.07   | 0.0024          | 0.0250             | mg/L  | 1.00        | 0.0032  | 107  | 75-125      |       |           |       |
| Lead                              | 4.05   | 0.0065          | 0.100              | mg/L  | 4.00        | ND  | 101  | 75-125      |       |           |       |
| Selenium                          | 4.40   | 0.0408          | 0.250              | mg/L  | 4.00        | ND  | 110  | 75-125      |       |           |       |
| Silver                            | 1.05   | 0.0022          | 0.0150             | mg/L  | 1.00        | ND  | 105  | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2017 13:59

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BF10756 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte                 | Result   | Detection Limit | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|----------|-----------------|-----------------|-------|--|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BF10756-BLK1)</b>       |          |                 |                 |       | Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 13:10                    |               |      |             |      |           |       |
| Mercury                           | 0.000050 | 0.000007        | 0.000100        | mg/L  |  |               |      |             |      |           | J     |
| <b>Duplicate (BF10756-DUP1)</b>   |          |                 |                 |       | Source: 1710208-08 Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 13:16 |               |      |             |      |           |       |
| Mercury                           | 0.000050 | 0.000007        | 0.000100        | mg/L  |  | 0.000050      |      |             | 0.00 |           | J     |
| <b>Matrix Spike (BF10756-MS1)</b> |          |                 |                 |       | Source: 1710208-08 Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 14:55 |               |      |             |      |           |       |
| Mercury                           | 0.00126  | 0.000007        | 0.000100        | mg/L  | 0.00100  | 0.000050      | 121  | 75-125      |      |           |       |

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Reported:  
09-Oct-2017 13:59

Wet Chemistry - Quality Control

Batch BFI0395 - EPA 300.0 11.7

Instrument: DX500 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit                                   | Units   | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|--------|---|---------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0395-BLK1)</b>   |        | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 15:57 |         |   |               |      |             |     |           |       |
| Orthophosphorus   | ND     | 1.00  | mg-P/kg |   |               |      |             |     |           | U     |
| Sulfate   | 1.22   | 1.00  | mg/kg   |   |               |      |             |     |           | *     |
| <b>LCS (BFI0395-BS1)</b>  |        | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 16:14 |         |   |               |      |             |     |           |       |
| Orthophosphorus   | 102    | 5.00  | mg-P/kg | 100   |               | 102  | 75-125      |     |           | D     |
| Sulfate   | 98.2   | 5.00  | mg/kg   | 100   |               | 98.2 | 75-125      |     |           | D, B  |
| <b>Duplicate (BFI0395-DUP1)</b>   |        | <b>Source: 17I0208-01</b>                         |         | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 16:48 |               |      |             |     |           |       |
| Orthophosphorus   | ND     | 7.17  | mg-P/kg |   | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BFI0395-MS1)</b>   |        | <b>Source: 17I0208-01</b>                         |         | Prepared: 19-Sep-2017 Analyzed: 19-Sep-2017 17:04 |               |      |             |     |           |       |
| Orthophosphorus   | ND     | 7.30  | mg-P/kg | 146   | ND            |      | 75-125      |     |           | *, U  |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |         |   |               |      |             |     |           |       |
| <b>Post Spike (BFI0395-PS1)</b>   |        | <b>Source: 17I0208-01</b>                         |         | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 11:36 |               |      |             |     |           |       |
| Orthophosphorus   | 1.98   |   | mg-P/kg | 2.00  | ND            | 75.3 | 0-200       |     |           | D     |
| Sulfate   | 7.57   |   | mg/kg   | 2.00  | 11.6          | NR   | 0-200       |     |           | D, B  |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2017 13:59

**Wet Chemistry - Quality Control**

**Batch BFI0401 - PSEP 1986**

Instrument: UV1800-1 Analyst: GM

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0401-BLK1)</b> |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 12:35 |      |             |     |           |       |
| Sulfide                     | ND     | 1.00            | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BFI0401-BS1)</b>    |        |                 |       |             | Prepared: 19-Sep-2017 Analyzed: 20-Sep-2017 12:35 |      |             |     |           |       |
| Sulfide                     | 123    | 10.0            | mg/kg | 159         |   | 77.5 | 75-125      |     |           | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 13:59

Wet Chemistry - Quality Control

Batch BFI0450 - EPA 300.0 11.7

Instrument: DX500 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units   | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|---|---------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFI0450-BLK1)</b>       |        | Prepared: 20-Sep-2017 Analyzed: 20-Sep-2017 16:17 |         |   |               |      |             |      |           |       |
| Orthophosphorus                   | ND     | 1.00  | mg-P/kg |   |               |      |             |      |           | U     |
| Sulfate                           | ND     | 1.00  | mg/kg   |   |               |      |             |      |           | U     |
| <b>LCS (BFI0450-BS1)</b>          |        | Prepared: 20-Sep-2017 Analyzed: 20-Sep-2017 16:34 |         |   |               |      |             |      |           |       |
| Orthophosphorus                   | 99.5   | 5.00  | mg-P/kg | 100   |               | 99.5 | 75-125      |      |           | D     |
| Sulfate                           | 97.7   | 5.00  | mg/kg   | 100   |               | 97.7 | 75-125      |      |           | D     |
| <b>Duplicate (BFI0450-DUP1)</b>   |        | <b>Source: 17I0208-01RE1</b>                      |         | Prepared: 20-Sep-2017 Analyzed: 20-Sep-2017 17:07 |               |      |             |      |           |       |
| Sulfate                           | 89.5   | 7.59  | mg/kg   |   | 96.1          |      |             | 7.09 | 20        | D     |
| <b>Matrix Spike (BFI0450-MS1)</b> |        | <b>Source: 17I0208-01RE1</b>                      |         | Prepared: 20-Sep-2017 Analyzed: 20-Sep-2017 17:24 |               |      |             |      |           |       |
| Sulfate                           | 230    | 7.25  | mg/kg   | 145   | 96.1          | 92.6 | 75-125      |      |           | D     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2017 13:59

**Wet Chemistry - Quality Control**

**Batch BFI0507 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0507-BLK1)</b> |        |                 |       |             | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 13:42 |      |             |     |           |       |
| Total Solids, Sulfide       | ND     | 0.040           | %     |             |   |      |             |     |           | U     |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>09-Oct-2017 13:59 |
|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFI0615 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0615-BLK1)</b> |        |                 |       |             | Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 14:16 |      |             |     |           |       |
| Total Solids                | ND     | 0.04            | %     |             |   |      |             |     |           | U     |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2017 13:59

**Wet Chemistry - Quality Control**

**Batch BFI0616 - EPA 9045D**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte               | Result | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|-------------|--|------|-------------|------|-----------|-------|
| <b>LCS (BFI0616-BS1)</b>        |        |                 |          |             | Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08                    |      |             |      |           |       |
| pH                              | 7.01   | 0.01            | pH Units | 8.75        |  | 80.1 | 0-200       |      |           |       |
| <b>Duplicate (BFI0616-DUP1)</b> |        |                 |          |             | Source: 17I0208-01 Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08 |      |             |      |           |       |
| pH                              | 5.29   | 0.02            | pH Units |             | 5.28   |      |             | 0.19 | 20        |       |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 13:59

Wet Chemistry - Quality Control

Batch BFI0619 - PSEP 1986 (modified)

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0619-BLK1)</b>     |        |                 |       | Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 10:10 |               |      |             |     |           |       |
| Total Carbon                    | ND     | 0.02            | %     |   |               |      |             |     |           | U     |
| Total Solids                    | ND     | 0.04            | %     |   |               |      |             |     |           | U     |
| <b>Blank (BFI0619-BLK2)</b>     |        |                 |       | Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 09:09 |               |      |             |     |           |       |
| Total Organic Carbon            | ND     | 0.02            | %     |   |               |      |             |     |           | U     |
| <b>Reference (BFI0619-SRM1)</b> |        |                 |       | Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 09:20 |               |      |             |     |           |       |
| Total Organic Carbon            | 2.94   | 0.02            | %     | 2.45  |               | 120  | 75-125      |     |           |       |
| <b>Reference (BFI0619-SRM2)</b> |        |                 |       | Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 10:17 |               |      |             |     |           |       |
| Total Carbon                    | 3.21   | 0.02            | %     | 3.35  |               | 95.9 | 80-120      |     |           |       |



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Reported:  
09-Oct-2017 13:59

**Certified Analyses included in this Report**

| Analyte                         | Certifications             |
|---------------------------------|----------------------------|
| <b>EPA 300.0 in Solid</b>       |                            |
| Orthophosphorus                 | DoD-ELAP,WA-DW,WADOE,NELAP |
| Sulfate                         | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 6010C in Solid</b>       |                            |
| Aluminum                        | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | NELAP,WADOE,DoD-ELAP,ADEC  |
| Iron                            | NELAP,WADOE,DoD-ELAP       |
| Manganese                       | NELAP,WADOE,DoD-ELAP       |
| Silver                          | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | CALAP,NELAP,WADOE          |
| Barium                          | CALAP,NELAP,WADOE          |
| Cadmium                         | NELAP,WADOE,DoD-ELAP       |
| Chromium                        | NELAP,WADOE,DoD-ELAP       |
| Lead                            | NELAP,WADOE,DoD-ELAP       |
| Selenium                        | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 7470A in Solid</b>       |                            |
| Mercury                         | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b>       |                            |
| pH                              | WADOE,CALAP,DoD-ELAP,NELAP |
| <b>EPA 9060A m in Solid</b>     |                            |
| Total Organic Carbon            | WADOE                      |
| <b>SM 4500-S2 D-00 in Solid</b> |                            |
| Sulfide                         | DoD-ELAP,NELAP,WADOE       |

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 13:59

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- L Analyte concentration is  $\leq 5$  times the reporting limit and the replicate control limit defaults to  $\pm$  RL instead of 20% RPD
- J Estimated concentration value detected below the reporting limit.
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



09 October 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
1710247

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 1710247  
 ARI Client Company: Pioneer Technologies  
 Client Contact: Troy Bussey (busseyt@uspioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227



Turn-around Requested: Normal  
 Date: 9/19/17 of 2  
 Page: 1  
 No. of Coolers: 1  
 Cooler Temps: \_\_\_\_\_

Phone: 360-570-1700  
 Samplers: DG Cooper 206-660-3466 / L. Kerner

| Sample ID                                      | Date   | Time             | Matrix          | No. Containers              | Analysis Requested   |  |                |                               |  |                           | Notes/Comments |                             |
|--|--|------------------|-----------------|-----------------------------|--|--|----------------|-------------------------------|--|---------------------------|----------------|-----------------------------|
|  |  |                  |                 |                             | Total Arsenic<br>EPA 3050B/6010C   | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Ag<br>EPA 1311/6010C/7470A | pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 3050B/6010C | Sulfate, Ortho-phosphorus<br>EPA 300.0   | TOC, TIC<br>EPA 9060A Mod |                | Sulfide<br>SM 4500-S2(PSEP) |
| <del>50-PTC-204-091917-10-8-12.8</del>         | <del>9/19/17</del>   | <del>11:00</del> | <del>soil</del> | <del>1-16oz<br/>1-2oz</del> | <del>X</del>   | <del>X</del>   | <del>X</del>   | <del>X</del>                  | <del>X</del>   | <del>X</del>              | <del>X</del>   |                             |
| 50-PTC-204-091917-10-8-12.8                    | 9/19/17  | 11:00            | SOIL            | 207-1<br>1-2oz              | X  | X  | X              | X                             | X  | X                         | X              |                             |
| 50-PTC-204-091917-10-8-12.8 - (10)             | 9/19/17  | 11:00            | SOIL            | 207-1                       | X  | X  | X              |                               |  |                           |                |                             |
| 50-PTC-204-091917-12.8-14.8                    | 9/19/17  | 10:50            | SOIL            | 1-16oz                      | X  | X  | X              |                               |  |                           |                |                             |
| 50-PTC-204-091917-12.8-14.8 - (10)             | 9/19/17  | 10:50            | SOIL            | 1-4oz                       | X  | X  | X              |                               |  |                           |                |                             |
| 50-PTC-204-091917-23.0-25.0                    | 9/19/17  | 10:15            | SOIL            | 1-16oz<br>1-2oz             | X  | X  | X              | X                             | X  | X                         | X              |                             |
| 50-PTC-204-091917-33.3-34.3                    | 9/19/17  | 10:30            | SOIL            | 1-16oz                      | X  | X  | X              |                               |  |                           |                |                             |
| 50-PTC-205-091917-8.0-10.0                     | 9/19/17  | 14:30            | SOIL            | 1-16oz<br>1-2oz             | X  | X  | X              | X                             | X  | X                         | X              |                             |
| 50-PTC-205-091917-8.0-10.0 - (10)              | 9/19/17  | 14:30            | SOIL            | 1-4oz                       | X  | X  | X              |                               |  |                           |                |                             |
| 50-PTC-205-091917-10.5-12.4                    | 9/19/17  | 14:40            |                 | 207-1                       | X  | X  | X              |                               |  |                           |                |                             |
| 50-PTC-205-091917-10.5-12.4 - (10)             | 9/19/17  | 14:40            |                 | 207-1                       | X  | X  | X              |                               |  |                           |                |                             |
| Comments/Special Instructions                  | Relinquished by: <i>[Signature]</i><br>Printed Name: Luke Kerner<br>Company: POF<br>Date & Time: 9/19/17 16:15 |                  |                 |                             | Received by: <i>[Signature]</i><br>Printed Name: Paul Mark<br>Company: ARI<br>Date & Time: 9/19/17 16:45 |  |                |                               | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____ |                           |                |                             |
| Sulfides preserved w/ZnAc                      | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____             |                  |                 |                             | Received by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____           |  |                |                               | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____ |                           |                |                             |
| Submit EDD to PIONEER using PIONEER EDD format | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____             |                  |                 |                             | Received by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____           |  |                |                               | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____ |                           |                |                             |
| Bill to Port of Tacoma                         | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____             |                  |                 |                             | Received by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____           |  |                |                               | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____ |                           |                |                             |
| PO#79227                                       | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____             |                  |                 |                             | Received by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____           |  |                |                               | Relinquished by: <i>[Signature]</i><br>Printed Name: _____<br>Company: _____<br>Date & Time: _____ |                           |                |                             |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: 9/19/17 of 2  
 Page: 2  
 No. of Coolers: 2 Cooler Temps: \_\_\_\_\_

Analysis Requested

| Sample ID | Date           | Time        | Matrix      | No. Containers | Analysis Requested               |   |                |                               |  |                           |                             |   | Notes/Comments |  |  |  |  |  |  |
|-----------|----------------|-------------|-------------|----------------|----------------------------------|---|----------------|-------------------------------|--|---------------------------|-----------------------------|---|----------------|--|--|--|--|--|--|
|           |                |             |             |                | Total Arsenic<br>EPA 3050B/6010C | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Ag<br>EPA 131/160/10C/7470A | pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 3050B/6010C | Sulfate, Ortho-phosphorus<br>EPA 300.0 | TOC, TIC<br>EPA 9060A Mod | Sulfide<br>SM 4500-S2(PSEP) |   |                |  |  |  |  |  |  |
|           |                |             |             | 1 - 16oz       | X                                |   |                |                               | X                                      | X                         | X                           | X |                |  |  |  |  |  |  |
|           | <u>9/19/17</u> | <u>1500</u> | <u>SOIL</u> | <u>1-16oz</u>  | X                                |   |                |                               | X                                      | X                         | X                           | X |                |  |  |  |  |  |  |
|           | <u>9/19/17</u> | <u>1530</u> | <u>SOIL</u> | <u>1-16oz</u>  | X                                |   |                |                               | X                                      | X                         | X                           | X |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |
|           |                |             |             |                |                                  |   |                |                               |  |                           |                             |   |                |  |  |  |  |  |  |

|   |  |  |
|---|--|--|
| Comments/Special Instructions<br>Sulfides preserved w/ZnAc<br>Submit EDD to PIONEER using<br>PIONEER EDD format<br>Bill to Port of Tacoma<br>PO#79227 | Relinquished by:<br>(Signature) <u>D. Kerner</u><br>Printed Name: <u>Dave Kerner</u><br>Company: <u>ARI</u><br>Date & Time: <u>9/19/17 16:45</u> | Received by:<br>(Signature) _____<br>Printed Name: _____<br>Company: _____<br>Date & Time: _____ |
|---|--|--|

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



WORK ORDER

1710247

Client: Pioneer Technologies Corporation      Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio      Project Number: Port of Tacoma Arkema- FS Data Gap Investi

Preservation Confirmation

| Container ID | Container Type               | pH   |
|--------------|------------------------------|------|
| 1710247-01 A | Glass WM, Clear, 16 oz       |      |
| 1710247-01 B | Glass WM, Clear, 2 oz, ZnOAc | fail |
| 1710247-02 A | Glass WM, Clear, 4 oz        |      |
| 1710247-03 A | Glass WM, Clear, 16 oz       |      |
| 1710247-04 A | Glass WM, Clear, 4 oz        |      |
| 1710247-05 A | Glass WM, Clear, 16 oz       |      |
| 1710247-05 B | Glass WM, Clear, 2 oz, ZnOAc | fail |
| 1710247-06 A | Glass WM, Clear, 16 oz       |      |
| 1710247-07 A | Glass WM, Clear, 16 oz       |      |
| 1710247-07 B | Glass WM, Clear, 2 oz, ZnOAc | fail |
| 1710247-08 A | Glass WM, Clear, 4 oz        |      |
| 1710247-09 A | Glass WM, Clear, 16 oz       |      |
| 1710247-10 A | Glass WM, Clear, 4 oz        |      |
| 1710247-11 A | Glass WM, Clear, 16 oz       |      |
| 1710247-11 B | Glass WM, Clear, 2 oz, ZnOAc | fail |
| 1710247-12 A | Glass WM, Clear, 16 oz       |      |

SE  
\_\_\_\_\_  
Preservation Confirmed By

9/19/17  
\_\_\_\_\_  
Date





# Cooler Receipt Form

ARI Client: Pioneer Technologies  
COC No(s): \_\_\_\_\_ NA  
Assigned ARI Job No: 17I0247

Project Name: \_\_\_\_\_  
Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_  
Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO   
Were custody papers included with the cooler? ..... YES  NO   
Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO   
Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 0.9  
Time: \_\_\_\_\_

If cooler temperature is out of compliance fill out form 00070F  
Cooler Accepted by: PM Date: 9/19/17 Time: 16:45 Temp Gun ID#: D005206

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO   
What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_  
Was sufficient ice used (if appropriate)? ..... NA  YES  NO   
Were all bottles sealed in individual plastic bags? ..... YES  NO   
Did all bottles arrive in good condition (unbroken)? ..... YES  NO   
Were all bottle labels complete and legible? ..... YES  NO   
Did the number of containers listed on COC match with the number of containers received? ..... YES  NO   
Did all bottle labels and tags agree with custody papers? ..... YES  NO   
Were all bottles used correct for the requested analyses? ..... YES  NO   
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO   
Were all VOC vials free of air bubbles? ..... NA  YES  NO   
Was sufficient amount of sample sent in each bottle? ..... YES  NO   
Date VOC Trip Blank was made at ARI ..... NA   
Was Sample Split by ARI : NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

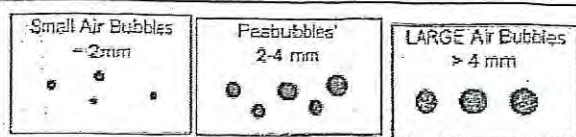
Samples Logged by: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

*Additional Notes, Discrepancies, & Resolutions:*

By: \_\_\_\_\_ Date: \_\_\_\_\_



Small → "sm" (< 2 mm)  
Peabubbles → "pb" (2 to < 4 mm)  
Large → "lg" (4 to < 6 mm)  
Headspace → "hs" (> 6 mm)



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2017 17:23

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                         | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-204-091917-10.8-12.8       | 17I0247-01    | Solid  | 19-Sep-2017 11:00 | 19-Sep-2017 16:45 |
| SO-PTC-204-101917-10.8-12.8-(10)  | 17I0247-02    | Solid  | 19-Sep-2017 11:00 | 19-Sep-2017 16:45 |
| SO-PTC-204-091917-12.8-14.8       | 17I0247-03    | Solid  | 19-Sep-2017 10:50 | 19-Sep-2017 16:45 |
| SO-PTC-204-091917-12.8-14.8-(10)  | 17I0247-04    | Solid  | 19-Sep-2017 10:50 | 19-Sep-2017 16:45 |
| SO-PTC-204-091917-23.0-25.0       | 17I0247-05    | Solid  | 19-Sep-2017 10:15 | 19-Sep-2017 16:45 |
| SO-PTC-204-091917-33.3-34.3       | 17I0247-06    | Solid  | 19-Sep-2017 10:30 | 19-Sep-2017 16:45 |
| SO-PTC-205-091917-8.0-10.0        | 17I0247-07    | Solid  | 19-Sep-2017 14:30 | 19-Sep-2017 16:45 |
| SO-PTC-205-101917-8.0-10.0(10)    | 17I0247-08    | Solid  | 19-Sep-2017 14:30 | 19-Sep-2017 16:45 |
| SO-PTC-205-091917--10.5-12.4      | 17I0247-09    | Solid  | 19-Sep-2017 14:40 | 19-Sep-2017 16:45 |
| SO-PTC-205-101917-10.5-12.4- (10) | 17I0247-10    | Solid  | 19-Sep-2017 14:40 | 19-Sep-2017 16:45 |
| SO-PTC-205-091917-20.0-22.0       | 17I0247-11    | Solid  | 19-Sep-2017 15:00 | 19-Sep-2017 16:45 |
| SO-PTC-205-091917-36.0-37.2       | 17I0247-12    | Solid  | 19-Sep-2017 15:30 | 19-Sep-2017 16:45 |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 17:23

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 19, 2017 under ARI workorder 1710247. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total and TCLP Metals - EPA Methods 6010C and 7471B

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0757 (total) has Aluminum detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. The method blank also has Iron and Manganese detected below the reporting limits, but above the method detection limits. These metals have been flagged with "J" qualifiers on the method blank. Method blank BFI0755 (tclp) has Chromium detected below the reporting limit, but above the method detection limit. Method blank BFI0756 has Mercury detected below the reporting limit, but above the method detection limit. These metals have been flagged with "J" qualifiers on the associated method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

### Anions - EPA 300.0

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

### pH - EPA Method 9045A

The samples were prepared and analyzed within the recommended holding times.

The LCS percent recoveries were within control limits.

### Total Organic and Inorganic Carbon - EPA Method 9060A

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.



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Reported:  
09-Oct-2017 17:23

The SRM percent recoveries were within control limits.

**Sulfide - Method SM4500**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.



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Reported:  
09-Oct-2017 17:23

**SO-PTC-204-091917-10.8-12.8**  
**1710247-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 11:00  
Analyzed: 03-Oct-2017 15:51

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.002 g (wet) Dry Weight: 0.76 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 75.49

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.664           | 6.61            | <b>7880</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.370           | 6.61            | <b>34.1</b> | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.477           | 6.61            | <b>9240</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0146          | 0.132           | <b>59.9</b> | mg/kg |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-10.8-12.8**  
**1710247-01 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/19/2017 11:00  
Analyzed: 20-Sep-2017 17:41

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10450 Sample Size: 4.27 g (wet) Dry Weight: 3.22 g  
Prepared: 20-Sep-2017 Final Volume: 40 mL % Solids: 75.49

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 6.20            | <b>11.7</b> | mg-P/kg | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 6.20            | <b>77.6</b> | mg/kg | D     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-10.8-12.8**  
**1710247-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2017 11:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.71 g (wet)

Final Volume: 40.52 mL

Dry Weight: 15.63 g

% Solids: 75.49

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>10.7</b> | pH Units |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-10.8-12.8**  
**1710247-01 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/19/2017 11:00  
Analyzed: 06-Oct-2017 11:20

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 75.49

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0754</b> | %     |       |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 12:46

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.75 g  
% Solids: 75.49

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.29</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.21</b> | %     |       |





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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-10.8-12.8**  
**1710247-01 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/19/2017 11:00  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 3.77 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 75.49

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>74.1</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-10.8-12.8**  
**1710247-01 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/19/2017 11:00  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.75 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 75.49

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>75.49</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-10.8-12.8**  
**1710247-01 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/19/2017 11:00  
Analyzed: 22-Sep-2017 17:29

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.459 g (wet) Dry Weight: 4.05 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 74.10

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.24            | <b>5.66</b> | mg/kg |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-10.8-12.8**  
**1710247-01RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/19/2017 11:00  
Analyzed: 21-Sep-2017 23:15

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10450 Sample Size: 4.27 g (wet) Dry Weight: 3.22 g  
Prepared: 20-Sep-2017 Final Volume: 40 mL % Solids: 75.49

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 6.20            | <b>81.6</b> | mg/kg | D     |



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Reported:  
09-Oct-2017 17:23

**SO-PTC-204-101917-10.8-12.8-(10)**  
**1710247-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 11:00  
Analyzed: 02-Oct-2017 18:30

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BF10755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.832</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0163</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0122</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-101917-10.8-12.8-(10)**  
**1710247-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/19/2017 11:00  
Analyzed: 02-Oct-2017 13:25

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000020</b> | mg/L  | J     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-12.8-14.8**  
**1710247-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 10:50  
Analyzed: 03-Oct-2017 16:06

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.017 g (wet) Dry Weight: 0.62 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 60.72

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.454           | 8.10            | <b>38.1</b> | mg/kg |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-12.8-14.8**  
**1710247-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2017 10:50

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.63 g (wet)

Final Volume: 40.44 mL

Dry Weight: 12.53 g

% Solids: 60.72

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>9.18</b> | pH Units |       |





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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-12.8-14.8**  
**1710247-03 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/19/2017 10:50  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 6.07 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 60.72

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>60.72</b> | %     |       |



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Reported:  
09-Oct-2017 17:23

**SO-PTC-204-091917-12.8-14.8-(10)**  
**1710247-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 10:50  
Analyzed: 02-Oct-2017 18:34

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BF10755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.464</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0168</b> | mg/L  |       |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0215</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-12.8-14.8-(10)**  
**1710247-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/19/2017 10:50  
Analyzed: 02-Oct-2017 13:27

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000010</b> | mg/L  | J     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 17:23

**SO-PTC-204-091917-23.0-25.0**  
**1710247-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 10:15  
Analyzed: 03-Oct-2017 15:55

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.026 g (wet) Dry Weight: 0.85 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 82.60

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.593           | 5.90            | <b>5430</b>  | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.331           | 5.90            | <b>56.2</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.426           | 5.90            | <b>10500</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0131          | 0.118           | <b>80.6</b>  | mg/kg |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-23.0-25.0**  
**1710247-05 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/19/2017 10:15  
Analyzed: 20-Sep-2017 17:57

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10450 Sample Size: 4.24 g (wet) Dry Weight: 3.50 g  
Prepared: 20-Sep-2017 Final Volume: 40 mL % Solids: 82.60

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 5.71            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 5.71            | <b>45.9</b> | mg/kg | D     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-23.0-25.0**  
**1710247-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 09/19/2017 10:15  
Analyzed: 27-Sep-2017 13:08

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFI0616 Sample Size: 20.82 g (wet) Dry Weight: 17.20 g  
Prepared: 25-Sep-2017 Final Volume: 40.99 mL % Solids: 82.60

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.56</b> | pH Units |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-23.0-25.0**  
**1710247-05 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/19/2017 10:15  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 4.13 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 82.60

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>78.4</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-23.0-25.0**  
**1710247-05 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/19/2017 10:15  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.83 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 82.60

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>82.60</b> | %     |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 17:23

**SO-PTC-204-091917-23.0-25.0**  
**17I0247-05RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/19/2017 10:15  
Analyzed: 06-Oct-2017 11:27

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 82.60

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | ND     | %     | U     |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 13:32

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.83 g  
% Solids: 82.60

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.52</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.68</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-23.0-25.0**  
**1710247-05RE1 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/19/2017 10:15  
Analyzed: 22-Sep-2017 17:47

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.059 g (wet) Dry Weight: 3.97 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 78.40

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 2        | 2.52            | <b>36.1</b> | mg/kg | D     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-33.3-34.3**  
**1710247-06 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 10:30  
Analyzed: 03-Oct-2017 16:10

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.055 g (wet) Dry Weight: 0.74 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 70.18

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.378           | 6.75            | <b>2.51</b> | mg/kg | J     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-33.3-34.3**  
**1710247-06 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2017 10:30

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.08 g (wet)

Final Volume: 39.66 mL

Dry Weight: 14.09 g

% Solids: 70.18

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.22   | pH Units |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-204-091917-33.3-34.3**  
**1710247-06 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/19/2017 10:30  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 7.02 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 70.18

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>70.18</b> | %     |       |



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Reported:  
09-Oct-2017 17:23

**SO-PTC-205-091917-8.0-10.0**  
**1710247-07 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 14:30  
Analyzed: 03-Oct-2017 15:58

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.004 g (wet) Dry Weight: 0.72 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 71.39

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.701           | 6.98            | <b>21100</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.391           | 6.98            | <b>14.8</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.503           | 6.98            | <b>14100</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0155          | 0.140           | <b>113</b>   | mg/kg |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-8.0-10.0**  
**1710247-07 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/19/2017 14:30  
Analyzed: 20-Sep-2017 18:14

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10450 Sample Size: 4.34 g (wet) Dry Weight: 3.10 g  
Prepared: 20-Sep-2017 Final Volume: 40 mL % Solids: 71.39

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 6.46            | <b>26.0</b> | mg-P/kg | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 6.46            | <b>65.5</b> | mg/kg | D     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-8.0-10.0**  
**1710247-07 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2017 14:30

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.07 g (wet)

Final Volume: 40.15 mL

Dry Weight: 14.33 g

% Solids: 71.39

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>11.4</b> | pH Units |       |





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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-8.0-10.0**  
**1710247-07 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/19/2017 14:30  
Analyzed: 06-Oct-2017 11:35

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 71.39

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.143</b> | %     |       |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 13:41

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.71 g  
% Solids: 71.39

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.32</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.17</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-8.0-10.0**  
**1710247-07 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/19/2017 14:30  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 3.57 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 71.39

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>70.5</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-8.0-10.0**  
**1710247-07 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/19/2017 14:30  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.71 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 71.39

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>71.39</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-8.0-10.0**  
**1710247-07 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/19/2017 14:30  
Analyzed: 22-Sep-2017 17:30

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.247 g (wet) Dry Weight: 3.70 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 70.50

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.35            | <b>1.97</b> | mg/kg |       |



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Reported:  
09-Oct-2017 17:23

**SO-PTC-205-101917-8.0-10.0(10)**  
**1710247-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 14:30  
Analyzed: 02-Oct-2017 18:38

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.174</b>  | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0099</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0109</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-101917-8.0-10.0(10)**  
**1710247-08 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/19/2017 14:30  
Analyzed: 02-Oct-2017 13:28

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000030</b> | mg/L  | J     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917--10.5-12.4**  
**1710247-09 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 14:40  
Analyzed: 03-Oct-2017 16:41

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.051 g (wet) Dry Weight: 0.46 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 43.97

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.606           | 10.8            | 17.3   | mg/kg |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917--10.5-12.4**  
**1710247-09 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2017 14:40

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.09 g (wet)

Final Volume: 39.93 mL

Dry Weight: 8.83 g

% Solids: 43.97

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>11.6</b> | pH Units |       |





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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917--10.5-12.4**  
**1710247-09 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/19/2017 14:40  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 4.40 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 43.97

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>43.97</b> | %     |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 17:23

**SO-PTC-205-101917-10.5-12.4- (10)**  
**1710247-10 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 14:40  
Analyzed: 02-Oct-2017 19:06

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.0505</b> | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0099</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | ND            | mg/L  | U     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0103</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-101917-10.5-12.4- (10)**  
**1710247-10 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/19/2017 14:40  
Analyzed: 02-Oct-2017 13:30

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000010</b> | mg/L  | J     |



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Reported:  
09-Oct-2017 17:23

**SO-PTC-205-091917-20.0-22.0**  
**1710247-11 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 15:00  
Analyzed: 03-Oct-2017 16:02

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.03 g (wet) Dry Weight: 0.79 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 76.25

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.639           | 6.37            | <b>10500</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.357           | 6.37            | <b>5.45</b>  | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.459           | 6.37            | <b>12400</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0141          | 0.127           | <b>71.7</b>  | mg/kg |       |



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Reported:  
09-Oct-2017 17:23

**SO-PTC-205-091917-20.0-22.0**  
**1710247-11 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 09/19/2017 15:00  
Analyzed: 20-Sep-2017 18:31

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BF10450 Sample Size: 4.24 g (wet) Dry Weight: 3.23 g  
Prepared: 20-Sep-2017 Final Volume: 40 mL % Solids: 76.25

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 12.4            | <b>18.0</b> | mg-P/kg | D     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 12.4            | <b>63.0</b> | mg/kg | D     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-20.0-22.0**  
**1710247-11 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 09/19/2017 15:00  
Analyzed: 27-Sep-2017 13:08

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFI0616 Sample Size: 20.22 g (wet) Dry Weight: 15.42 g  
Prepared: 25-Sep-2017 Final Volume: 40.11 mL % Solids: 76.25

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>11.0</b> | pH Units |       |



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Reported:  
09-Oct-2017 17:23

**SO-PTC-205-091917-20.0-22.0**  
**1710247-11 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/19/2017 15:00  
Analyzed: 06-Oct-2017 12:02

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 76.25

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0505</b> | %     |       |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 13:51

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.76 g  
% Solids: 76.25

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.35</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.30</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-20.0-22.0**  
**1710247-11 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/19/2017 15:00  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 3.81 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 76.25

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 74.3   | %     |       |





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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-20.0-22.0**  
**1710247-11 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/19/2017 15:00  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.76 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 76.25

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>76.25</b> | %     |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-20.0-22.0**  
**1710247-11 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/19/2017 15:00  
Analyzed: 22-Sep-2017 17:30

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.665 g (wet) Dry Weight: 4.21 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 74.30

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 2        | 2.38            | <b>45.9</b> | mg/kg | D     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-36.0-37.2**  
**1710247-12 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/19/2017 15:30  
Analyzed: 03-Oct-2017 16:45

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.083 g (wet) Dry Weight: 0.65 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 59.75

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.433           | 7.73            | <b>6.62</b> | mg/kg | J     |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-36.0-37.2**  
**1710247-12 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/19/2017 15:30

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.29 g (wet)

Final Volume: 40.29 mL

Dry Weight: 12.12 g

% Solids: 59.75

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.76   | pH Units |       |



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**Reported:**  
09-Oct-2017 17:23

**SO-PTC-205-091917-36.0-37.2**  
**1710247-12 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/19/2017 15:30  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 5.97 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 59.75

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>59.75</b> | %     |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
09-Oct-2017 17:23

**Metals and Metallic Compounds - Quality Control**

**Batch BFI0757 - SWC EPA 3050B**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0757-BLK1)</b> |        |                 |                 |       |             | Prepared: 29-Sep-2017 Analyzed: 03-Oct-2017 15:34 |      |             |     |           |       |
| Aluminum                    | 26.8   | 0.502           | 5.00            | mg/kg |             |   |      |             |     |           |       |
| Arsenic                     | ND     | 0.280           | 5.00            | mg/kg |             |   |      |             |     |           | U     |
| Iron                        | 0.672  | 0.361           | 5.00            | mg/kg |             |   |      |             |     |           | J     |
| Manganese                   | 0.0154 | 0.0111          | 0.100           | mg/kg |             |   |      |             |     |           | J     |
| <b>LCS (BFI0757-BS1)</b>    |        |                 |                 |       |             | Prepared: 29-Sep-2017 Analyzed: 03-Oct-2017 15:37 |      |             |     |           |       |
| Aluminum                    | 215    | 0.502           | 5.00            | mg/kg | 200         |   | 107  | 80-120      |     |           | B     |
| Arsenic                     | 209    | 0.280           | 5.00            | mg/kg | 200         |   | 104  | 80-120      |     |           |       |
| Iron                        | 205    | 0.361           | 5.00            | mg/kg | 200         |   | 102  | 80-120      |     |           |       |
| Manganese                   | 50.5   | 0.0111          | 0.100           | mg/kg | 50.0        |   | 101  | 80-120      |     |           |       |



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**Reported:**  
09-Oct-2017 17:23

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0755 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0755-BLK1)</b> |        |                 |                 |       |             | Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 18:01 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0140          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Barium                      | ND     | 0.0075          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |
| Cadmium                     | ND     | 0.0006          | 0.0100          | mg/L  |             |   |      |             |     |           | U     |
| Chromium                    | 0.0055 | 0.0024          | 0.0250          | mg/L  |             |   |      |             |     |           | J     |
| Lead                        | ND     | 0.0065          | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| Selenium                    | ND     | 0.0408          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Silver                      | ND     | 0.0022          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |



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**Reported:**  
09-Oct-2017 17:23

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0756 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result   | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|----------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0756-BLK1)</b> |          |                 |                 |       |             | Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 13:10 |      |             |     |           |       |
| Mercury                     | 0.000050 | 0.000007        | 0.000100        | mg/L  |             |   |      |             |     |           | J     |





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Reported:  
09-Oct-2017 17:23

Wet Chemistry - Quality Control

Batch BFI0450 - EPA 300.0 11.7

Instrument: DX500 Analyst: KK

| QC Sample/Analyte           | Result | Reporting Limit                                   | Units   | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|---|---------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0450-BLK1)</b> |        | Prepared: 20-Sep-2017 Analyzed: 20-Sep-2017 16:17 |         |             |               |      |             |     |           |       |
| Orthophosphorus             | ND     | 1.00  | mg-P/kg |             |               |      |             |     |           | U     |
| Sulfate                     | ND     | 1.00  | mg/kg   |             |               |      |             |     |           | U     |
| <b>LCS (BFI0450-BS1)</b>    |        | Prepared: 20-Sep-2017 Analyzed: 20-Sep-2017 16:34 |         |             |               |      |             |     |           |       |
| Orthophosphorus             | 99.5   | 5.00  | mg-P/kg | 100         |               | 99.5 | 75-125      |     |           | D     |
| Sulfate                     | 97.7   | 5.00  | mg/kg   | 100         |               | 97.7 | 75-125      |     |           | D     |



|  |  |                                       |
|--|--|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>09-Oct-2017 17:23 |
|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFI0507 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0507-BLK1)</b> |        |                 |       |             | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 13:42 |      |             |     |           |       |
| Total Solids, Sulfide       | ND     | 0.040           | %     |             |   |      |             |     |           | U     |



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**Reported:**  
09-Oct-2017 17:23

**Wet Chemistry - Quality Control**

**Batch BFI0535 - PSEP 1986**

Instrument: UV1800-1 Analyst: GM

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0535-BLK1)</b> |        |                 |       |             | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 17:03 |      |             |     |           |       |
| Sulfide                     | ND     | 1.00            | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BFI0535-BS1)</b>    |        |                 |       |             | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 17:04 |      |             |     |           |       |
| Sulfide                     | 137    | 10.0            | mg/kg | 155         |   | 88.3 | 75-125      |     |           | D     |



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**Reported:**  
09-Oct-2017 17:23

**Wet Chemistry - Quality Control**

**Batch BFI0615 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>Blank (BFI0615-BLK1)</b> |        |                 |       |             |               | Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 14:16 |             |     |           |       |
| Total Solids                | ND     | 0.04            | %     |             |               |   |             |     |           | U     |



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**Reported:**  
09-Oct-2017 17:23

**Wet Chemistry - Quality Control**

**Batch BFI0616 - EPA 9045D**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte        | Result | Reporting Limit | Units    | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|--------------------------|--------|-----------------|----------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>LCS (BFI0616-BS1)</b> |        |                 |          |             |               | Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08 |             |     |           |       |
| pH                       | 7.01   | 0.01            | pH Units | 8.75        |               | 80.1  | 0-200       |     |           |       |



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Reported:  
09-Oct-2017 17:23

Wet Chemistry - Quality Control

Batch BFI0619 - PSEP 1986 (modified)

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte               | Result | Reporting Limit                                   | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---------------------------------|--------|---|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0619-BLK1)</b>     |        | Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 10:10 |       |             |               |      |             |     |           |       |
| Total Carbon                    | ND     | 0.02  | %     |             |               |      |             |     |           | U     |
| Total Solids                    | ND     | 0.04  | %     |             |               |      |             |     |           | U     |
| <b>Blank (BFI0619-BLK2)</b>     |        | Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 09:09 |       |             |               |      |             |     |           |       |
| Total Organic Carbon            | ND     | 0.02  | %     |             |               |      |             |     |           | U     |
| <b>Reference (BFI0619-SRM1)</b> |        | Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 09:20 |       |             |               |      |             |     |           |       |
| Total Organic Carbon            | 2.94   | 0.02  | %     | 2.45        |               | 120  | 75-125      |     |           |       |
| <b>Reference (BFI0619-SRM2)</b> |        | Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 10:17 |       |             |               |      |             |     |           |       |
| Total Carbon                    | 3.21   | 0.02  | %     | 3.35        |               | 95.9 | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Oct-2017 17:23

**Certified Analyses included in this Report**

| Analyte                         | Certifications             |
|---------------------------------|----------------------------|
| <b>EPA 300.0 in Solid</b>       |                            |
| Orthophosphorus                 | DoD-ELAP,WA-DW,WADOE,NELAP |
| Sulfate                         | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 6010C in Solid</b>       |                            |
| Aluminum                        | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | NELAP,WADOE,DoD-ELAP,ADEC  |
| Iron                            | NELAP,WADOE,DoD-ELAP       |
| Manganese                       | NELAP,WADOE,DoD-ELAP       |
| Silver                          | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | CALAP,NELAP,WADOE          |
| Barium                          | CALAP,NELAP,WADOE          |
| Cadmium                         | NELAP,WADOE,DoD-ELAP       |
| Chromium                        | NELAP,WADOE,DoD-ELAP       |
| Lead                            | NELAP,WADOE,DoD-ELAP       |
| Selenium                        | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 7470A in Solid</b>       |                            |
| Mercury                         | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9045D in Solid</b>       |                            |
| pH                              | WADOE,CALAP,DoD-ELAP,NELAP |
| <b>EPA 9060A m in Solid</b>     |                            |
| Total Organic Carbon            | WADOE                      |
| <b>SM 4500-S2 D-00 in Solid</b> |                            |
| Sulfide                         | DoD-ELAP,NELAP,WADOE       |

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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**Reported:**  
09-Oct-2017 17:23

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.





09 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

17I0272

Associated SDG ID(s)

N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



Date: 9/20/17  
Page: 1 of 2  
No. of Coolers: \_\_\_\_\_  
Cooler Temps: \_\_\_\_\_

ARI Assigned Number: 1710272  
ARI Client Company: Pioneer Technologies  
Client Contact: Troy Bussey (busseyt@uspioneer.com)  
Client Project Name: Arkema FS DG Inv  
Client Project #: 79227

## Analysis Requested

| EPA 305B/6010C | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Ag | EPA 1311/6010C/7470A | pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 305B/6010C | Sulfate, Ortho-phosphorus<br>EPA 300.0 | TOC, TIC<br>EPA 9060A Mod | Sulfide<br>SM 4500-S2(PSEP) |
|----------------|--|----------------------|----------------|------------------------------|--|---------------------------|-----------------------------|
|----------------|--|----------------------|----------------|------------------------------|--|---------------------------|-----------------------------|

| Sample ID | Date | Time | Matrix | No. Containers | Notes/Comments |
|-----------|------|------|--------|----------------|----------------|
|-----------|------|------|--------|----------------|----------------|

|   |                |              |             |               |          |          |          |          |  |  |  |          |          |  |  |  |  |               |
|---|----------------|--------------|-------------|---------------|----------|----------|----------|----------|--|--|--|----------|----------|--|--|--|--|---------------|
| <u>50-PTC-113-092017-7.5-10.0</u>       | <u>9/20/17</u> | <u>10:20</u> | <u>Soil</u> | <u>1-16oz</u> | <u>X</u> | <u>X</u> | <u>X</u> | <u>X</u> |  |  |  |          |          |  |  |  |  | <u>MJ/MJD</u> |
| <u>50-PTC-113-092017-7.5-10.0-(10)</u>  | <u>9/20/17</u> | <u>10:20</u> | <u>Soil</u> | <u>1-4oz</u>  |          |          |          |          |  |  |  |          |          |  |  |  |  |               |
| <u>50-PTC-113-092017-12.3-14.3</u>      | <u>9/20/17</u> | <u>10:00</u> | <u>Soil</u> | <u>1-16oz</u> | <u>X</u> | <u>X</u> |          |          |  |  |  |          |          |  |  |  |  |               |
| <u>50-PTC-113-092017-12.3-14.3-(10)</u> | <u>9/20/17</u> | <u>10:00</u> | <u>Soil</u> | <u>1-4oz</u>  |          |          |          |          |  |  |  |          |          |  |  |  |  |               |
| <u>50-PTC-113-092017-18.0-20.0</u>      | <u>9/20/17</u> | <u>10:35</u> | <u>Soil</u> | <u>1-16oz</u> | <u>X</u> | <u>X</u> |          |          |  |  |  | <u>X</u> | <u>X</u> |  |  |  |  |               |
| <u>50-PTC-113-092017-37.0-39.0</u>      | <u>9/20/17</u> | <u>09:45</u> | <u>Soil</u> | <u>1-16oz</u> | <u>X</u> | <u>X</u> | <u>X</u> |          |  |  |  | <u>X</u> | <u>X</u> |  |  |  |  |               |
| <u>50-PTC-113-092017-7.5-10.0-(10)</u>  | <u>9/20/17</u> | <u>10:25</u> | <u>Soil</u> | <u>1-16oz</u> | <u>X</u> | <u>X</u> |          |          |  |  |  | <u>X</u> | <u>X</u> |  |  |  |  |               |
| <u>50-PTC-129-092017-10.0-12.0</u>      | <u>9/20/17</u> | <u>13:15</u> | <u>Soil</u> | <u>1-16oz</u> | <u>X</u> | <u>X</u> |          |          |  |  |  | <u>X</u> | <u>X</u> |  |  |  |  |               |
| <u>50-PTC-129-092017-10.0-12.0-(10)</u> | <u>9/20/17</u> | <u>13:15</u> | <u>Soil</u> | <u>1-4oz</u>  |          |          |          |          |  |  |  |          |          |  |  |  |  |               |
| <u>50-PTC-129-092017-17.3-20.0</u>      | <u>9/20/17</u> | <u>13:20</u> | <u>Soil</u> | <u>1-16oz</u> | <u>X</u> | <u>X</u> |          |          |  |  |  |          |          |  |  |  |  |               |
| <u>50-PTC-129-092017-17.3-20.0-(10)</u> | <u>9/20/17</u> | <u>13:20</u> | <u>Soil</u> | <u>1-4oz</u>  |          |          |          |          |  |  |  |          |          |  |  |  |  |               |

| Relinquished by:                  | Received by:                      |
|-----------------------------------|-----------------------------------|
| (Signature) <u>Luke Kerne</u>     | (Signature) <u>Paul Mark</u>      |
| Printed Name: <u>Luke Kerne</u>   | Printed Name: <u>Paul Mark</u>    |
| Company: <u>DOTF</u>              | Company: <u>ARI</u>               |
| Date & Time: <u>9/20/17 16:50</u> | Date & Time: <u>9/20/17 16:50</u> |

Comments/Special Instructions: ulfides preserved w/ZnAc  
submit EDD to PIONEER using  
PIONEER EDD format  
ill to Port of Tacoma  
0#79227

Terms of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 1710272 Turn-around Requested: Normal  
 ARI Client Company: Pioneer Technologies Phone: 360-570-1700  
 Client Contact: Troy Bussey (busseyt@pioneer.com)  
 Client Project Name: Arkema FS DG Inv  
 Client Project #: 79227  
 Samplers: DG Cooper 286-660-3466 / Kerno

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



| Sample ID  | Date    | Time | Matrix | No. Containers  | Analysis Requested                               |                    |  |                |  |           | Notes/Comments              |          |                                     |  |
|--|---------|------|--------|-----------------|--|--------------------|--|----------------|--|-----------|-----------------------------|----------|-------------------------------------|--|
|  |         |      |        |                 | TCMP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Ag | EPA 1311/6010/1200 | Fe, Al, Mn                                   | EPA 305B/6010C | Substrate, ortho-phosphate               | EPA 300.0 |                             | TOC, TIC | EPA 9060A Mod                       |  |
| 80-PTC-129-092017-22.5-25.0  | 9/20/17 | 1325 | SOIL   | 1-202<br>1-1602 | X  | X                  | X  | X              | X  | X         | X                           | X        | SM 41500-28/28/28<br>pH<br>EPA 9045 |  |
| 80-PTC-129-092017-35.8-36.5  | 9/20/17 | 1500 | SOIL   | 1-1602          | X  | X                  | X  | X              | X  | X         | X                           | X        |                                     |  |
| EB-EB-01-092017  | 9/20/17 | 1530 | WATER  | 4               | X  | X                  | X  | X              | X  | X         | X                           | X        |                                     |  |
| Comments/Special Instructions<br>Substrate preserved w/ Znac<br>Submit EDD to PIONEER using<br>PIONEER EDD format<br>Bill to Port of Tacoma<br>PO# 79227 |         |      |        |                 | Relinquished by:<br>(Signature)<br>Luke Kerner   |                    | Relinquished by:<br>(Signature)<br>Paul Mark |                | Received by:<br>(Signature)<br>Paul Mark |           | Received by:<br>(Signature) |          |                                     |  |
|  |         |      |        |                 | Printed Name:<br>Luke Kerner                     |                    | Printed Name:<br>Paul Mark                   |                | Printed Name:                            |           | Printed Name:               |          |                                     |  |
|  |         |      |        |                 | Company:<br>DOF                                  |                    | Company:<br>ARI                              |                | Company:                                 |           | Company:                    |          |                                     |  |
| Date & Time:<br>9/20/17 16:50  |         |      |        |                 | Date & Time:<br>9/20/2017 16:50                  |                    | Date & Time:                                 |                | Date & Time:                             |           | Date & Time:                |          |                                     |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.





# Cooler Receipt Form

ARI Client: Pioneer Technologies

Project Name: Arkema

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17I0272

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) Time: 3.8

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: D005206

Cooler Accepted by: PM Date: 9/20/2017 Time: 16:50

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO

Were all VOC vials free of air bubbles? ..... NA YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI ..... NA

Was Sample Split by ARI :  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: B.H. Date: 9/21/17 Time: 7:47

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle       | Sample ID on COC                   | Sample ID on Bottle | Sample ID on COC |
|---------------------------|------------------------------------|---------------------|------------------|
| <u>50-PTC-129-092017-</u> | <u>50-PTC-129-092017-10.0-12.0</u> |                     |                  |
|                           |                                    |                     |                  |
|                           |                                    |                     |                  |

Additional Notes, Discrepancies, & Resolutions:

By: B.H. Date: 9/21/17

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



WORK ORDER

17I0272

Client: Pioneer Technologies Corporation Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio Project Number: 79227

Preservation Confirmation

| Container ID | Container Type                    | pH       |
|--------------|-----------------------------------|----------|
| 17I0272-01 A | Glass WM, Clear, 2 oz, ZnOAc      |          |
| 17I0272-01 B | Glass WM, Clear, 16 oz            |          |
| 17I0272-02 A | Glass WM, Clear, 4 oz             |          |
| 17I0272-03 A | Glass WM, Clear, 16 oz            |          |
| 17I0272-04 A | Glass WM, Clear, 4 oz             |          |
| 17I0272-05 A | Glass WM, Clear, 2 oz, ZnOAc      |          |
| 17I0272-05 B | Glass WM, Clear, 16 oz            |          |
| 17I0272-06 A | Glass WM, Clear, 16 oz            |          |
| 17I0272-07 A | Glass WM, Clear, 2 oz, ZnOAc      |          |
| 17I0272-07 B | Glass WM, Clear, 16 oz            |          |
| 17I0272-08 A | Glass WM, Clear, 2 oz, ZnOAc      |          |
| 17I0272-08 B | Glass WM, Clear, 16 oz            |          |
| 17I0272-09 A | Glass WM, Clear, 4 oz             |          |
| 17I0272-10 A | Glass WM, Clear, 16 oz            |          |
| 17I0272-11 A | Glass WM, Clear, 4 oz             |          |
| 17I0272-12 A | Glass WM, Clear, 2 oz, ZnOAc      |          |
| 17I0272-12 B | Glass WM, Clear, 16 oz            |          |
| 17I0272-13 A | Glass WM, Clear, 16 oz            |          |
| 17I0272-14 A | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass  |
| 17I0272-14 B | Small OJ, 500 mL, ZnOAc           | L12 Fail |
| 17I0272-14 C | Small OJ, 500 mL                  |          |
| 17I0272-14 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass  |

B.H.  
Preservation Confirmed By

9/21/17  
Date

B.H.  
Reviewed By

9/21/17  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                        | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|----------------------------------|---------------|--------|-------------------|-------------------|
| SO-PTC-113-092017-7.5-10.0       | 17I0272-01    | Solid  | 20-Sep-2017 10:20 | 20-Sep-2017 16:50 |
| SO-PTC-113-092017-7.5-10.0-(10)  | 17I0272-02    | Solid  | 20-Sep-2017 10:20 | 20-Sep-2017 16:50 |
| SO-PTC-113-092017-12.3-14.3      | 17I0272-03    | Solid  | 20-Sep-2017 10:00 | 20-Sep-2017 16:50 |
| SO-PTC-113-092017-12.3-14.3-(10) | 17I0272-04    | Solid  | 20-Sep-2017 10:00 | 20-Sep-2017 16:50 |
| SO-PTC-113-092017-18.0-20.0      | 17I0272-05    | Solid  | 20-Sep-2017 10:35 | 20-Sep-2017 16:50 |
| SO-PTC-113-092017-37.0-39.0      | 17I0272-06    | Solid  | 20-Sep-2017 09:45 | 20-Sep-2017 16:50 |
| SO-PTC-113-092017-7.5-10.0-(01)  | 17I0272-07    | Solid  | 20-Sep-2017 10:25 | 20-Sep-2017 16:50 |
| SO-PTC-129-092017-10.0-12.0      | 17I0272-08    | Solid  | 20-Sep-2017 13:15 | 20-Sep-2017 16:50 |
| SO-PTC-129-092017-10.0-12.0-(10) | 17I0272-09    | Solid  | 20-Sep-2017 13:15 | 20-Sep-2017 16:50 |
| SO-PTC-129-092017-17.3-20.0      | 17I0272-10    | Solid  | 20-Sep-2017 13:20 | 20-Sep-2017 16:50 |
| SO-PTC-129-092017-17.3-20.0-(10) | 17I0272-11    | Solid  | 20-Sep-2017 13:20 | 20-Sep-2017 16:50 |
| SO-PTC-129-092017-22.5-25.0      | 17I0272-12    | Solid  | 20-Sep-2017 13:25 | 20-Sep-2017 16:50 |
| SO-PTC-129-092017-35.8-36.5      | 17I0272-13    | Solid  | 20-Sep-2017 15:00 | 20-Sep-2017 16:50 |
| EB-EB-01-092017                  | 17I0272-14    | Water  | 20-Sep-2017 15:30 | 20-Sep-2017 16:50 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Nov-2017 13:58

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received September 20, 2017 under ARI workorder 1710272. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total and TCLP Metals - EPA Methods 6010C and 7471B

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0757 (total) has Aluminum detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. The method blank also has Iron and Manganese detected below the reporting limits, but above the method detection limits. Method blank BFI0573 (water) has Iron detected below the reporting limit, but above the method detection limit. These metals have been flagged with "J" qualifiers on the method blank. Method blank BFI0755 (tclp) has Chromium detected below the reporting limit, but above the method detection limit. Method blank BFI0756 has Mercury detected below the reporting limit, but above the method detection limit. These metals have been flagged with "J" qualifiers on the associated method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike/matrix spike duplicate and duplicate were prepared in conjunction with sample SO-PTC-113-092017-7.5-10.0. The duplicate RPD were within QC limits. The matrix spike/matrix spike duplicate has natural concentrations of Aluminum and Iron that are so much greater than the concentration spiked that an accurate determination of spike recovery is not possible. These metals have been flagged with an "HC" qualifier on the matrix spike and matrix spike duplicate. No further corrective action was taken.

### Anions - EPA 300.0

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Method blank BFI0514 has Sulfate detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SO-PTC-113-092017-7.5-10.0. The duplicate has high RPD for Sulfate. The matrix spike has low spike recovery for Orthophosphorus. This is likely due to matrix interference. The results are advisory. No corrective action was taken.

### pH - EPA Method 9045A

The pH for sample EB-EB-01-092017 was received outside of the fifteen minute recommended holding time, and has been



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
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Reported:  
09-Nov-2017 13:58

flagged with an "H" qualifier.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with samples SO-PTC-113-092017-7.5-10.0 and EB-EB-01-092017. The duplicate RPD was within QC limits.

#### **Total Organic and Inorganic Carbon - EPA Method 9060A**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with samples SO-PTC-113-092017-7.5-10.0 and EB-EB-01-092017. The water matrix spike percent recovery and duplicate were within QC limits. The soil duplicates Dup3 and Dup5 have high Total Carbon RPD. The matrix spikes MS2 and MS3 have high spike recovery for Total Carbon. This is likely due to matrix interference. No corrective action was taken.

#### **Sulfide - Method SM4500**

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with samples SO-PTC-113-092017-7.5-10.0 and EB-EB-01-092017. The water matrix spike percent recovery and duplicate RPD were within QC limits. The soil duplicate RPD was within QC limits. The soil matrix spike has high spike recovery. This is likely due to matrix interference. No corrective action was taken.





WORK ORDER

17I0272

Client: Pioneer Technologies Corporation      Project Manager: Amanda Volgardsen  
Project: Port of Tacoma Arkema- FS Data Gap Investigatio      Project Number: 79227

Preservation Confirmation

| Container ID | Container Type                    | pH                              |
|--------------|-----------------------------------|---------------------------------|
| 17I0272-01 A | Glass WM, Clear, 2 oz, ZnOAc      |                                 |
| 17I0272-01 B | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-02 A | Glass WM, Clear, 4 oz             |                                 |
| 17I0272-03 A | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-04 A | Glass WM, Clear, 4 oz             |                                 |
| 17I0272-05 A | Glass WM, Clear, 2 oz, ZnOAc      |                                 |
| 17I0272-05 B | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-06 A | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-07 A | Glass WM, Clear, 2 oz, ZnOAc      |                                 |
| 17I0272-07 B | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-08 A | Glass WM, Clear, 2 oz, ZnOAc      |                                 |
| 17I0272-08 B | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-09 A | Glass WM, Clear, 4 oz             |                                 |
| 17I0272-10 A | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-11 A | Glass WM, Clear, 4 oz             |                                 |
| 17I0272-12 A | Glass WM, Clear, 2 oz, ZnOAc      |                                 |
| 17I0272-12 B | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-13 A | Glass WM, Clear, 16 oz            |                                 |
| 17I0272-14 A | Glass NM, Amber, 250 mL, 9N H2SO4 | LO Pass                         |
| 17I0272-14 B | Small OJ, 500 mL, ZnOAc           | LO Fail 2ml (6N) NaOH + pH > 12 |
| 17I0272-14 C | Small OJ, 500 mL                  | 9-21-17                         |
| 17I0272-14 D | HDPE NM, 500 mL, 1:1 HNO3         | LO Pass                         |

B.H.  
Preservation Confirmed By

9/21/17  
Date

B.H.  
Reviewed By

9/21/17  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0**  
**1710272-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 10:20  
Analyzed: 03-Oct-2017 16:53

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.084 g (wet) Dry Weight: 0.87 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 80.22

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.577           | 5.75            | <b>7880</b>  | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.322           | 5.75            | <b>386</b>   | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.415           | 5.75            | <b>10100</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0127          | 0.115           | <b>61.6</b>  | mg/kg |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0**  
**1710272-01 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 10:20  
Analyzed: 21-Sep-2017 22:17

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0514 Sample Size: 4.15 g (wet) Dry Weight: 3.33 g  
Prepared: 21-Sep-2017 Final Volume: 40 mL % Solids: 80.22

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 6.01            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 6.01            | <b>38.8</b> | mg/kg | D, B  |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0**  
**1710272-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2017 10:20

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.65 g (wet)

Final Volume: 40.68 mL

Dry Weight: 16.57 g

% Solids: 80.22

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 6.73   | pH Units |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0**  
**1710272-01 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/20/2017 10:20  
Analyzed: 06-Oct-2017 14:40

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 80.22

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | ND     | %     | U     |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 14:37

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.80 g  
% Solids: 80.22

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.07</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.08</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0**  
**1710272-01 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/20/2017 10:20  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 4.01 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 80.22

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>76.0</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0**  
**1710272-01 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 10:20  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.80 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 80.22

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>80.22</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0**  
**1710272-01 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/20/2017 10:20  
Analyzed: 22-Sep-2017 17:05

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.066 g (wet) Dry Weight: 3.85 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 76.00

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.30            | ND     | mg/kg | U     |





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Reported:  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(10)**  
**1710272-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 10:20  
Analyzed: 03-Oct-2017 19:11

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.350</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | ND            | mg/L  | U     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0009</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0380</b> | mg/L  |       |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(10)**  
**1710272-02 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/20/2017 10:20  
Analyzed: 02-Oct-2017 13:32

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000040</b> | mg/L  | J     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-12.3-14.3**  
**1710272-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 10:00  
Analyzed: 03-Oct-2017 21:06

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.049 g (wet) Dry Weight: 0.61 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 57.80

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 5        | 1.16            | 20.6            | <b>6210</b> | mg/kg | D     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-12.3-14.3**  
**1710272-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2017 10:00

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.1 g (wet)

Final Volume: 39.9 mL

Dry Weight: 11.62 g

% Solids: 57.80

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>8.14</b> | pH Units |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-12.3-14.3**  
**1710272-03 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 10:00  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 5.78 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 57.80

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>57.80</b> | %     |       |



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Reported:  
09-Nov-2017 13:58

**SO-PTC-113-092017-12.3-14.3-(10)**  
**1710272-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 10:00  
Analyzed: 03-Oct-2017 19:24

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>39.9</b>   | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0122</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0240</b> | mg/L  |       |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | <b>0.0111</b> | mg/L  | J     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | <b>0.0079</b> | mg/L  | J     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-12.3-14.3-(10)**  
**1710272-04 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/20/2017 10:00  
Analyzed: 02-Oct-2017 13:33

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000040</b> | mg/L  | J     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-18.0-20.0**  
**1710272-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 10:35  
Analyzed: 03-Oct-2017 17:45

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.038 g (wet) Dry Weight: 0.75 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 72.08

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.671           | 6.68            | <b>9030</b>  | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.374           | 6.68            | <b>1430</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.482           | 6.68            | <b>10000</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0148          | 0.134           | <b>51.3</b>  | mg/kg |       |





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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-18.0-20.0**  
**1710272-05 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 10:35  
Analyzed: 21-Sep-2017 23:20

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0514 Sample Size: 4.43 g (wet) Dry Weight: 3.19 g  
Prepared: 21-Sep-2017 Final Volume: 40 mL % Solids: 72.08

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 10       | 12.5            | <b>21.1</b> | mg-P/kg | D     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-18.0-20.0**  
**1710272-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2017 10:35

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.66 g (wet)

Final Volume: 40.71 mL

Dry Weight: 14.89 g

% Solids: 72.08

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>7.84</b> | pH Units |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-18.0-20.0**  
**1710272-05 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/20/2017 10:35  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 3.60 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 72.08

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 73.1   | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-18.0-20.0**  
**1710272-05 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 10:35  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.72 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 72.08

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>72.08</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-18.0-20.0**  
**1710272-05 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/20/2017 10:35  
Analyzed: 22-Sep-2017 17:27

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.574 g (wet) Dry Weight: 4.07 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 73.10

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.23            | <b>4.64</b> | mg/kg |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-18.0-20.0**  
**17I0272-05RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 10:35  
Analyzed: 23-Sep-2017 15:33

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0514 Sample Size: 4.43 g (wet) Dry Weight: 3.19 g  
Prepared: 21-Sep-2017 Final Volume: 40 mL % Solids: 72.08

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 25.1            | <b>338</b> | mg/kg | D, B  |



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Reported:  
09-Nov-2017 13:58

**SO-PTC-113-092017-18.0-20.0**  
**17I0272-05RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/20/2017 10:35  
Analyzed: 06-Oct-2017 13:18

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 72.08

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.282</b> | %     |       |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 14:04

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.72 g  
% Solids: 72.08

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.92</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.64</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-37.0-39.0**  
**1710272-06 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 09:45  
Analyzed: 03-Oct-2017 17:49

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.013 g (wet) Dry Weight: 0.59 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 58.60

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.472           | 8.42            | <b>6.64</b> | mg/kg | J     |





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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-37.0-39.0**  
**1710272-06 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 09/20/2017 09:45  
Analyzed: 27-Sep-2017 13:08

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFI0616 Sample Size: 20.21 g (wet) Dry Weight: 11.84 g  
Prepared: 25-Sep-2017 Final Volume: 39.91 mL % Solids: 58.60

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>6.63</b> | pH Units |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-37.0-39.0**  
**1710272-06 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 09:45  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 5.86 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 58.60

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>58.60</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Reported:  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(01)**  
**1710272-07 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 10:25  
Analyzed: 03-Oct-2017 17:52

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFI0757 Sample Size: 1.022 g (wet) Dry Weight: 0.85 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 83.07

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.592           | 5.89            | <b>7190</b>  | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.330           | 5.89            | <b>441</b>   | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.425           | 5.89            | <b>10200</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0130          | 0.118           | <b>76.4</b>  | mg/kg |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(01)**  
**1710272-07 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 10:25  
Analyzed: 21-Sep-2017 23:39

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0514 Sample Size: 4.14 g (wet) Dry Weight: 3.44 g  
Prepared: 21-Sep-2017 Final Volume: 40 mL % Solids: 83.07

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 5.82            | ND     | mg-P/kg | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 5        | 5.82            | <b>34.8</b> | mg/kg | D, B  |



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Olympia WA, 98503

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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(01)**  
**1710272-07 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2017 10:25

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.16 g (wet)

Final Volume: 40.15 mL

Dry Weight: 16.75 g

% Solids: 83.07

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>6.89</b> | pH Units |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(01)**  
**1710272-07 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/20/2017 10:25  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 4.15 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 83.07

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>79.0</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(01)**  
**1710272-07 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 10:25  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.83 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 83.07

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>83.07</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(01)**  
**1710272-07 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/20/2017 10:25  
Analyzed: 22-Sep-2017 17:27

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.04 g (wet) Dry Weight: 3.98 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 79.00

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.26            | ND     | mg/kg | U     |





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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-113-092017-7.5-10.0-(01)**  
**17I0272-07RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/20/2017 10:25  
Analyzed: 06-Oct-2017 13:44

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 83.07

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | ND     | %     | U     |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 14:09

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.83 g  
% Solids: 83.07

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.06</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.04</b> | %     |       |



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Reported:  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0**  
**1710272-08 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 13:15  
Analyzed: 03-Oct-2017 17:56

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.039 g (wet) Dry Weight: 0.91 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 87.67

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.551           | 5.49            | <b>5250</b>  | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.308           | 5.49            | <b>353</b>   | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.396           | 5.49            | <b>13400</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0122          | 0.110           | <b>79.8</b>  | mg/kg |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0**  
**1710272-08 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 13:15  
Analyzed: 21-Sep-2017 23:59

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0514 Sample Size: 4.23 g (wet) Dry Weight: 3.71 g  
Prepared: 21-Sep-2017 Final Volume: 40 mL % Solids: 87.67

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 5.39            | ND     | mg-P/kg | U     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0**  
**1710272-08 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2017 13:15

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.61 g (wet)

Final Volume: 40.51 mL

Dry Weight: 18.07 g

% Solids: 87.67

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 5.79   | pH Units |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0**  
**1710272-08 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/20/2017 13:15  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 4.38 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 87.67

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>81.4</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0**  
**1710272-08 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 13:15  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.88 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 87.67

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>87.67</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0**  
**1710272-08 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/20/2017 13:15  
Analyzed: 22-Sep-2017 17:28

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.647 g (wet) Dry Weight: 4.60 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 81.40

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.09            | ND     | mg/kg | U     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0**  
**17I0272-08RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 13:15  
Analyzed: 23-Sep-2017 15:53

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0514 Sample Size: 4.23 g (wet) Dry Weight: 3.71 g  
Prepared: 21-Sep-2017 Final Volume: 40 mL % Solids: 87.67

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 21.6            | <b>358</b> | mg/kg | D, B  |





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Reported:  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0**  
**17I0272-08RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/20/2017 13:15  
Analyzed: 06-Oct-2017 13:59

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 87.67

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0481</b> | %     |       |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 14:17

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.88 g  
% Solids: 87.67

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.10</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.05</b> | %     |       |



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Reported:  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0-(10)**  
**1710272-09 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 13:15  
Analyzed: 03-Oct-2017 19:16

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.204</b>  | mg/L  | J     |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0103</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0008</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-10.0-12.0-(10)**  
**1710272-09 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/20/2017 13:15  
Analyzed: 02-Oct-2017 13:35

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000010</b> | mg/L  | J     |



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5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-17.3-20.0**  
**1710272-10 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 13:20  
Analyzed: 03-Oct-2017 18:00

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.062 g (wet) Dry Weight: 0.74 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 69.42

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.380           | 6.78            | <b>66.1</b> | mg/kg |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-17.3-20.0**  
**1710272-10 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2017 13:20

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0616

Prepared: 25-Sep-2017

Sample Size: 20.07 g (wet)

Final Volume: 39.95 mL

Dry Weight: 13.93 g

% Solids: 69.42

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>10.2</b> | pH Units |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-17.3-20.0**  
**17I0272-10 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 13:20  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 6.94 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 69.42

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>69.42</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

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Reported:  
09-Nov-2017 13:58

**SO-PTC-129-092017-17.3-20.0-(10)**  
**1710272-11 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 13:20  
Analyzed: 03-Oct-2017 19:20

Sample Preparation: Preparation Method: LEN Digestion of EPA 1311 Elutriate  
Preparation Batch: BFI0755 Sample Size: 25 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 25 mL

| Analyte  | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Arsenic  | 7440-38-2  | 5        | 0.0140          | 0.250           | <b>0.255</b>  | mg/L  |       |
| Barium   | 7440-39-3  | 5        | 0.0075          | 0.0150          | <b>0.0147</b> | mg/L  | J     |
| Cadmium  | 7440-43-9  | 5        | 0.0006          | 0.0100          | <b>0.0016</b> | mg/L  | J     |
| Chromium | 7440-47-3  | 5        | 0.0024          | 0.0250          | ND            | mg/L  | U     |
| Lead     | 7439-92-1  | 5        | 0.0065          | 0.100           | ND            | mg/L  | U     |
| Selenium | 7782-49-2  | 5        | 0.0408          | 0.250           | ND            | mg/L  | U     |
| Silver   | 7440-22-4  | 5        | 0.0022          | 0.0150          | ND            | mg/L  | U     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-17.3-20.0-(10)**  
**1710272-11 (Solid)**

**TCLP Metals and Metallic Compounds**

Method: EPA 7470A  
Instrument: CETAC

Sampled: 09/20/2017 13:20  
Analyzed: 02-Oct-2017 13:36

Sample Preparation: Preparation Method: LEM 7470A Digestion of EPA 1311 Elutriate for Hg  
Preparation Batch: BF10756 Sample Size: 20 mL (wet)  
Prepared: 29-Sep-2017 Final Volume: 20 mL

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result          | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-----------------|-------|-------|
| Mercury | 7439-97-6  | 1        | 0.000007        | 0.000100        | <b>0.000020</b> | mg/L  | J     |





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Reported:  
09-Nov-2017 13:58

**SO-PTC-129-092017-22.5-25.0**  
**1710272-12 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 13:25  
Analyzed: 03-Oct-2017 18:03

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.014 g (wet) Dry Weight: 0.85 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 83.49

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.593           | 5.91            | 4720   | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.331           | 5.91            | 239    | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.426           | 5.91            | 7210   | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0131          | 0.118           | 49.6   | mg/kg |       |



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Olympia WA, 98503

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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-22.5-25.0**  
**1710272-12 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 13:25  
Analyzed: 22-Sep-2017 00:18

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0514 Sample Size: 4.17 g (wet) Dry Weight: 3.48 g  
Prepared: 21-Sep-2017 Final Volume: 40 mL % Solids: 83.49

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 5.74            | ND     | mg-P/kg | U     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-22.5-25.0**  
**1710272-12 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 09/20/2017 13:25

Instrument: Accumet AR60

Analyzed: 27-Sep-2017 13:08

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFI0618

Prepared: 25-Sep-2017

Sample Size: 20.29 g (wet)

Final Volume: 40.44 mL

Dry Weight: 16.94 g

% Solids: 83.49

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.02            | <b>5.96</b> | pH Units |       |



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Reported:  
09-Nov-2017 13:58

**SO-PTC-129-092017-22.5-25.0**  
**1710272-12 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 09/20/2017 13:25  
Analyzed: 06-Oct-2017 14:18

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 25-Sep-2017 Final Volume: 1 % Solids: 83.49

| Analyte          | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------|------------|----------|-----------------|--------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | ND     | %     | U     |

Instrument: APOLLO1

Analyzed: 05-Oct-2017 14:22

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619  
Prepared: 25-Sep-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.83 g  
% Solids: 83.49

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.20</b> | %     |       |

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.19</b> | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-22.5-25.0**  
**1710272-12 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 09/20/2017 13:25  
Analyzed: 21-Sep-2017 13:42

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10507 Sample Size: 5 g (wet) Dry Weight: 4.17 g  
Prepared: 21-Sep-2017 Final Volume: 5 g % Solids: 83.49

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 77.7   | %     |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-22.5-25.0**  
**17I0272-12 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 13:25  
Analyzed: 26-Sep-2017 12:10

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFI0619 Sample Size: 1 g (wet) Dry Weight: 0.83 g  
Prepared: 25-Sep-2017 Final Volume: 1 mL % Solids: 83.49

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>83.49</b> | %     |       |



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09-Nov-2017 13:58

**SO-PTC-129-092017-22.5-25.0**  
**1710272-12 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/20/2017 13:25  
Analyzed: 22-Sep-2017 17:28

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BF10535 Sample Size: 5.023 g (wet) Dry Weight: 3.90 g  
Prepared: 22-Sep-2017 Final Volume: 100 mL % Solids: 77.70

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.28            | <b>24.6</b> | mg/kg |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-22.5-25.0**  
**17I0272-12RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 13:25  
Analyzed: 26-Sep-2017 12:30

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFI0514 Sample Size: 4.17 g (wet) Dry Weight: 3.48 g  
Prepared: 21-Sep-2017 Final Volume: 40 mL % Solids: 83.49

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 11.5            | <b>158</b> | mg/kg | D, B  |





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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-35.8-36.5**  
**1710272-13 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 15:00  
Analyzed: 03-Oct-2017 18:07

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BF10757 Sample Size: 1.036 g (wet) Dry Weight: 0.59 g  
Prepared: 29-Sep-2017 Final Volume: 50 mL % Solids: 56.72

| Analyte | CAS Number | Dilution | Detection Limit | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-----------------|-------------|-------|-------|
| Arsenic | 7440-38-2  | 2        | 0.477           | 8.51            | <b>6.79</b> | mg/kg | J     |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-35.8-36.5**  
**1710272-13 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 09/20/2017 15:00  
Analyzed: 27-Sep-2017 13:08

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFI0616 Sample Size: 20.36 g (wet) Dry Weight: 11.55 g  
Prepared: 25-Sep-2017 Final Volume: 40.42 mL % Solids: 56.72

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.02            | 7.02   | pH Units |       |



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**Reported:**  
09-Nov-2017 13:58

**SO-PTC-129-092017-35.8-36.5**  
**1710272-13 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 09/20/2017 15:00  
Analyzed: 25-Sep-2017 14:16

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10615 Sample Size: 10 g (wet) Dry Weight: 5.67 g  
Prepared: 25-Sep-2017 Final Volume: 10 g % Solids: 56.72

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>56.72</b> | %     |       |



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Reported:  
09-Nov-2017 13:58

**EB-EB-01-092017**  
**17I0272-14 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 09/20/2017 15:30  
Analyzed: 25-Sep-2017 16:17

Sample Preparation: Preparation Method: TWC EPA 3010A  
Preparation Batch: BF10573 Sample Size: 25 mL  
Prepared: 25-Sep-2017 Final Volume: 25 mL

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Arsenic   | 7440-38-2  | 1        | 0.0047          | 0.0500          | ND            | mg/L  | U     |
| Iron      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0051</b> | mg/L  | J     |
| Manganese | 7439-96-5  | 1        | 0.0003          | 0.0010          | ND            | mg/L  | U     |



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**Reported:**  
09-Nov-2017 13:58

**EB-EB-01-092017**  
**17I0272-14 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX2100

Sampled: 09/20/2017 15:30  
Analyzed: 21-Sep-2017 20:15

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10520 Sample Size: 5 mL  
Prepared: 21-Sep-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



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09-Nov-2017 13:58

**EB-EB-01-092017**  
**17I0272-14 (Water)**

**Wet Chemistry**

Method: EPA 9040C  
Instrument: Accumet AR60

Sampled: 09/20/2017 15:30  
Analyzed: 21-Sep-2017 13:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10512 Sample Size: 50 mL  
Prepared: 21-Sep-2017 Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 5.95   | pH Units | H     |



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**Reported:**  
09-Nov-2017 13:58

**EB-EB-01-092017**  
**17I0272-14 (Water)**

**Wet Chemistry**

Method: EPA 9060A  
Instrument: TOC-LCSH

Sampled: 09/20/2017 15:30  
Analyzed: 25-Sep-2017 21:18

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFI0624 Sample Size: 20 mL  
Prepared: 25-Sep-2017 Final Volume: 20 mL

| Analyte              | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Organic Carbon |            | 1        | 0.50            | ND     | mg/L  | U     |

Instrument: UV1800-2

Analyzed: 22-Sep-2017 17:49

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFI0552 Sample Size: 20 mL  
Prepared: 22-Sep-2017 Final Volume: 20 mL

| Analyte                | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------------|------------|----------|-----------------|--------|-------|-------|
| Total Inorganic Carbon |            | 1        | 0.50            | ND     | mg/L  | U     |



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**Reported:**  
09-Nov-2017 13:58

**EB-EB-01-092017**  
**17I0272-14 (Water)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-1

Sampled: 09/20/2017 15:30  
Analyzed: 22-Sep-2017 16:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BF10561 Sample Size: 5 mL  
Prepared: 22-Sep-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 0.050           | ND     | mg/L  | U     |





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Reported:  
09-Nov-2017 13:58

**Metals and Metallic Compounds - Quality Control**

**Batch BFI0573 - TWC EPA 3010A**

Instrument: ICP2 Analyst: TCH

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0573-BLK1)</b> |        |                 |                 |       |             | Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 14:38 |      |             |     |           |       |
| Aluminum                    | ND     | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Arsenic                     | ND     | 0.0047          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron                        | 0.0034 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Manganese                   | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFI0573-BS1)</b>    |        |                 |                 |       |             | Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 15:14 |      |             |     |           |       |
| Aluminum                    | 2.06   | 0.0085          | 0.0500          | mg/L  | 2.00        |   | 103  | 80-120      |     |           |       |
| Arsenic                     | 2.02   | 0.0047          | 0.0500          | mg/L  | 2.00        |   | 101  | 80-120      |     |           |       |
| Iron                        | 2.03   | 0.0013          | 0.0500          | mg/L  | 2.00        |   | 102  | 80-120      |     |           |       |
| Manganese                   | 0.482  | 0.0003          | 0.0010          | mg/L  | 0.500       |   | 96.3 | 80-120      |     |           |       |



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Reported:  
09-Nov-2017 13:58

**Metals and Metallic Compounds - Quality Control**

**Batch BF10757 - SWC EPA 3050B**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte   | Result | Detection Limit | Reporting Limit    | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|--------|-----------------|--------------------|-------|-------------|---|------|-------------|-------|-----------|-------|
| <b>Blank (BF10757-BLK1)</b>   |        |                 |                    |       |             |   |      |             |       |           |       |
|   |        |                 |                    |       |             | Prepared: 29-Sep-2017 Analyzed: 03-Oct-2017 15:34 |      |             |       |           |       |
| Aluminum  | 26.8   | 0.502           | 5.00               | mg/kg |             |   |      |             |       |           |       |
| Arsenic   | ND     | 0.280           | 5.00               | mg/kg |             |   |      |             |       |           | U     |
| Iron  | 0.672  | 0.361           | 5.00               | mg/kg |             |   |      |             |       |           | J     |
| Manganese   | 0.0154 | 0.0111          | 0.100              | mg/kg |             |   |      |             |       |           | J     |
| <b>LCS (BF10757-BS1)</b>  |        |                 |                    |       |             |   |      |             |       |           |       |
|   |        |                 |                    |       |             | Prepared: 29-Sep-2017 Analyzed: 03-Oct-2017 15:37 |      |             |       |           |       |
| Aluminum  | 215    | 0.502           | 5.00               | mg/kg | 200         |   | 107  | 80-120      |       |           | B     |
| Arsenic   | 209    | 0.280           | 5.00               | mg/kg | 200         |   | 104  | 80-120      |       |           |       |
| Iron  | 205    | 0.361           | 5.00               | mg/kg | 200         |   | 102  | 80-120      |       |           |       |
| Manganese   | 50.5   | 0.0111          | 0.100              | mg/kg | 50.0        |   | 101  | 80-120      |       |           |       |
| <b>Duplicate (BF10757-DUP1)</b>   |        |                 |                    |       |             |   |      |             |       |           |       |
|   |        |                 | Source: 1710272-01 |       |             | Prepared: 29-Sep-2017 Analyzed: 03-Oct-2017 16:50 |      |             |       |           |       |
| Aluminum  | 7600   | 0.579           | 5.77               | mg/kg |             | 7880  |      |             | 3.65  | 20        | B     |
| Arsenic   | 467    | 0.323           | 5.77               | mg/kg |             | 386   |      |             | 19.00 | 20        |       |
| Iron  | 11100  | 0.416           | 5.77               | mg/kg |             | 10100   |      |             | 9.53  | 20        |       |
| Manganese   | 66.3   | 0.0128          | 0.115              | mg/kg |             | 61.6  |      |             | 7.35  | 20        |       |
| <b>Matrix Spike (BF10757-MS1)</b>   |        |                 |                    |       |             |   |      |             |       |           |       |
|   |        |                 | Source: 1710272-01 |       |             | Prepared: 29-Sep-2017 Analyzed: 03-Oct-2017 16:57 |      |             |       |           |       |
| Aluminum  | 7640   | 0.576           | 5.74               | mg/kg | 230         | 7880  | NR   | 75-125      |       |           | HC, B |
| Arsenic   | 632    | 0.322           | 5.74               | mg/kg | 230         | 386   | 107  | 75-125      |       |           |       |
| Iron  | 10200  | 0.414           | 5.74               | mg/kg | 230         | 10100   | 38.0 | 75-125      |       |           | HC    |
| Manganese   | 111    | 0.0127          | 0.115              | mg/kg | 57.4        | 61.6  | 86.5 | 75-125      |       |           |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |                 |                    |       |             |   |      |             |       |           |       |
| <b>Matrix Spike Dup (BF10757-MSD1)</b>                                      |        |                 |                    |       |             |   |      |             |       |           |       |
|   |        |                 | Source: 1710272-01 |       |             | Prepared: 29-Sep-2017 Analyzed: 03-Oct-2017 17:01 |      |             |       |           |       |
| Aluminum  | 7700   | 0.576           | 5.74               | mg/kg | 230         | 7880  | NR   | 75-125      | 0.82  | 20        | HC, B |
| Arsenic   | 641    | 0.322           | 5.74               | mg/kg | 230         | 386   | 111  | 75-125      | 1.38  | 20        |       |
| Iron  | 10400  | 0.414           | 5.74               | mg/kg | 230         | 10100   | 141  | 75-125      | 2.29  | 20        | HC    |
| Manganese   | 114    | 0.0127          | 0.115              | mg/kg | 57.4        | 61.6  | 90.7 | 75-125      | 2.17  | 20        |       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |                 |                    |       |             |   |      |             |       |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0755 - LEN Digestion of EPA 1311 Elutriate**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0755-BLK1)</b> |        |                 |                 |       |             | Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 18:01 |      |             |     |           |       |
| Arsenic                     | ND     | 0.0140          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Barium                      | ND     | 0.0075          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |
| Cadmium                     | ND     | 0.0006          | 0.0100          | mg/L  |             |   |      |             |     |           | U     |
| Chromium                    | 0.0055 | 0.0024          | 0.0250          | mg/L  |             |   |      |             |     |           | J     |
| Lead                        | ND     | 0.0065          | 0.100           | mg/L  |             |   |      |             |     |           | U     |
| Selenium                    | ND     | 0.0408          | 0.250           | mg/L  |             |   |      |             |     |           | U     |
| Silver                      | ND     | 0.0022          | 0.0150          | mg/L  |             |   |      |             |     |           | U     |



|  |  |                                       |
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| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: 79227<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>09-Nov-2017 13:58 |
|--|--|---------------------------------------|

**TCLP Metals and Metallic Compounds - Quality Control**

**Batch BFI0756 - LEM 7470A Digestion of EPA 1311 Elutriate for Hg**

Instrument: CETAC Analyst: MCB

| QC Sample/Analyte           | Result   | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|----------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0756-BLK1)</b> |          |                 |                 |       |             | Prepared: 29-Sep-2017 Analyzed: 02-Oct-2017 13:10 |      |             |     |           |       |
| Mercury                     | 0.000050 | 0.000007        | 0.000100        | mg/L  |             |   |      |             |     |           | J     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**Wet Chemistry - Quality Control**

**Batch BF10507 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BF10507-BLK1)</b>     |        |                 |       |             | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 13:42                    |      |             |      |           |       |
| Total Solids, Sulfide           | ND     | 0.040           | %     |             |  |      |             |      |           | U     |
| <b>Duplicate (BF10507-DUP1)</b> |        |                 |       |             | Source: 17I0272-01 Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 13:42 |      |             |      |           |       |
| Total Solids, Sulfide           | 75.9   | 0.040           | %     |             | 76.0   |      |             | 0.16 | 20        |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Nov-2017 13:58

**Wet Chemistry - Quality Control**

**Batch BF10512 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte               | Result | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|-------------|--|------|-------------|------|-----------|-------|
| <b>LCS (BF10512-BS1)</b>        |        |                 |          |             | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 13:55                    |      |             |      |           |       |
| pH                              | 7.02   | 0.01            | pH Units | 7.00        |  | 100  | 0-200       |      |           |       |
| <b>Duplicate (BF10512-DUP1)</b> |        |                 |          |             | Source: 17I0272-14 Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 13:55 |      |             |      |           |       |
| pH                              | 6.07   | 0.01            | pH Units |             | 5.95   |      |             | 2.00 | 20        | H     |
| <b>Duplicate (BF10512-DUP2)</b> |        |                 |          |             | Source: 17I0272-14 Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 13:55 |      |             |      |           |       |
| pH                              | 5.81   | 0.01            | pH Units |             | 5.95   |      |             | 2.38 | 20        | H     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
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Project Manager: Troy Bussey Jr.

Reported:  
09-Nov-2017 13:58

Wet Chemistry - Quality Control

Batch BFI0514 - EPA 300.0 11.7

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units   | Spike Level                                       | Source Result | %REC | %REC Limits | RPD    | RPD Limit | Notes   |
|-----------------------------------|--------|---|---------|---|---------------|------|-------------|--------|-----------|---------|
| <b>Blank (BFI0514-BLK1)</b>       |        | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 21:36 |         |   |               |      |             |        |           |         |
| Orthophosphorus                   | ND     | 1.00  | mg-P/kg |   |               |      |             |        |           | U       |
| Sulfate                           | 1.35   | 1.00  | mg/kg   |   |               |      |             |        |           | *       |
| <b>LCS (BFI0514-BS1)</b>          |        | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 21:57 |         |   |               |      |             |        |           |         |
| Orthophosphorus                   | 97.4   | 5.00  | mg-P/kg | 100   |               | 97.4 | 75-125      |        |           | D       |
| Sulfate                           | 102    | 5.00  | mg/kg   | 100   |               | 102  | 75-125      |        |           | B, D    |
| <b>Duplicate (BFI0514-DUP1)</b>   |        | <b>Source: 17I0272-01</b>                         |         | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 22:38 |               |      |             |        |           |         |
| Orthophosphorus                   | ND     | 6.08  | mg-P/kg |   | ND            |      |             |        |           | U       |
| Sulfate                           | 10.1   | 6.08  | mg/kg   |   | 38.8          |      |             | 117.00 | 20        | *, B, D |
| <b>Matrix Spike (BFI0514-MS1)</b> |        | <b>Source: 17I0272-01</b>                         |         | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 22:59 |               |      |             |        |           |         |
| Orthophosphorus                   | 78.0   | 5.77  | mg-P/kg | 115   | ND            | 67.6 | 75-125      |        |           | *, D    |
| Sulfate                           | 128    | 5.77  | mg/kg   | 115   | 38.8          | 77.1 | 75-125      |        |           | D, B    |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**Wet Chemistry - Quality Control**

**Batch BFI0520 - No Prep Wet Chem**

Instrument: DX2100 Analyst: KK

| QC Sample/Analyte           | Result | Reporting Limit                                   | Units  | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|---|--------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0520-BLK1)</b> |        | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 17:56 |        |             |               |      |             |     |           |       |
| Orthophosphorus             | ND     | 0.10  | mg-P/L |             |               |      |             |     |           | U     |
| Sulfate                     | ND     | 0.100   | mg/L   |             |               |      |             |     |           | U     |
| <b>LCS (BFI0520-BS1)</b>    |        | Prepared: 21-Sep-2017 Analyzed: 21-Sep-2017 18:16 |        |             |               |      |             |     |           |       |
| Orthophosphorus             | 1.47   | 0.10  | mg-P/L | 1.50        |               | 98.0 | 75-125      |     |           |       |
| Sulfate                     | 1.48   | 0.100   | mg/L   | 1.50        |               | 98.7 | 75-125      |     |           |       |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Nov-2017 13:58

Wet Chemistry - Quality Control

Batch BFI0535 - PSEP 1986

Instrument: UV1800-1 Analyst: GM

| QC Sample/Analyte                 | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0535-BLK1)</b>       |        |                 |       |             | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 17:03                    |      |             |     |           |       |
| Sulfide                           | ND     | 1.00            | mg/kg |             |  |      |             |     |           | U     |
| <b>LCS (BFI0535-BS1)</b>          |        |                 |       |             | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 17:04                    |      |             |     |           |       |
| Sulfide                           | 137    | 10.0            | mg/kg | 155         |  | 88.3 | 75-125      |     |           | D     |
| <b>Duplicate (BFI0535-DUP1)</b>   |        |                 |       |             | Source: 17I0272-01 Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 17:05 |      |             |     |           |       |
| Sulfide                           | ND     | 1.23            | mg/kg |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BFI0535-MS1)</b> |        |                 |       |             | Source: 17I0272-01 Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 17:05 |      |             |     |           |       |
| Sulfide                           | 12.0   | 1.20            | mg/kg | 186         | ND   | 6.42 | 75-125      |     |           | *     |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**Wet Chemistry - Quality Control**

**Batch BFI0552 - No Prep Wet Chem**

Instrument: UV1800-2 Analyst: CDE

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0552-BLK1)</b>       |        | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 17:15 |       |   |               |      |             |     |           |       |
| Total Inorganic Carbon            | ND     | 0.50  | mg/L  |   |               |      |             |     |           | U     |
| <b>LCS (BFI0552-BS1)</b>          |        | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 17:29 |       |   |               |      |             |     |           |       |
| Total Inorganic Carbon            | 19.3   | 0.50  | mg/L  | 20.0  |               | 96.3 | 90-110      |     |           |       |
| <b>Duplicate (BFI0552-DUP1)</b>   |        | <b>Source: 17I0272-14</b>                         |       | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 18:02 |               |      |             |     |           |       |
| Total Inorganic Carbon            | ND     | 0.50  | mg/L  |   | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BFI0552-MS1)</b> |        | <b>Source: 17I0272-14</b>                         |       | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 18:16 |               |      |             |     |           |       |
| Total Inorganic Carbon            | 10.1   | 0.50  | mg/L  | 10.0  | ND            | 101  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**Wet Chemistry - Quality Control**

**Batch BFI0561 - No Prep Wet Chem**

Instrument: UV1800-1 Analyst: GM

| QC Sample/Analyte                 | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0561-BLK1)</b>       |        |                 |       |             | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 16:19                    |      |             |     |           |       |
| Sulfide                           | ND     | 0.050           | mg/L  |             |  |      |             |     |           | U     |
| <b>LCS (BFI0561-BS1)</b>          |        |                 |       |             | Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 16:19                    |      |             |     |           |       |
| Sulfide                           | 0.498  | 0.050           | mg/L  | 0.502       |  | 99.1 | 75-125      |     |           |       |
| <b>Duplicate (BFI0561-DUP1)</b>   |        |                 |       |             | Source: 17I0272-14 Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 16:20 |      |             |     |           |       |
| Sulfide                           | ND     | 0.050           | mg/L  |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BFI0561-MS1)</b> |        |                 |       |             | Source: 17I0272-14 Prepared: 22-Sep-2017 Analyzed: 22-Sep-2017 16:20 |      |             |     |           |       |
| Sulfide                           | 0.453  | 0.050           | mg/L  | 0.502       | ND   | 90.2 | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



|  |  |                                       |
|--|--|---------------------------------------|
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|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFI0615 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0615-BLK1)</b> |        |                 |       |             | Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 14:16 |      |             |     |           |       |
| Total Solids                | ND     | 0.04            | %     |             |   |      |             |     |           | U     |



|  |  |                                       |
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|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFI0616 - EPA 9045D**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte        | Result | Reporting Limit | Units    | Spike Level | Source Result | %REC  | %REC Limits | RPD | RPD Limit | Notes |
|--------------------------|--------|-----------------|----------|-------------|---------------|---|-------------|-----|-----------|-------|
| <b>LCS (BFI0616-BS1)</b> |        |                 |          |             |               | Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08 |             |     |           |       |
| pH                       | 7.01   | 0.01            | pH Units | 8.75        |               | 80.1  | 0-200       |     |           |       |



|  |  |                                       |
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|--|--|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFI0618 - EPA 9045D**

Instrument: Accumet AR60 Analyst: k

| QC Sample/Analyte               | Result | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|-------------|--|------|-------------|------|-----------|-------|
| <b>LCS (BFI0618-BS1)</b>        |        |                 |          |             | Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08                    |      |             |      |           |       |
| pH                              | 7.00   | 0.01            | pH Units | 7.00        |  | 100  | 0-200       |      |           |       |
| <b>Duplicate (BFI0618-DUP1)</b> |        |                 |          |             | Source: 17I0272-01 Prepared: 25-Sep-2017 Analyzed: 27-Sep-2017 13:08 |      |             |      |           |       |
| pH                              | 6.68   | 0.02            | pH Units |             | 6.73   |      |             | 0.75 | 20        |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

Reported:  
09-Nov-2017 13:58

### Wet Chemistry - Quality Control

#### Batch BFI0619 - PSEP 1986 (modified)

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte   | Result | Reporting Limit | Units | Spike Level  | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|--------|-----------------|-------|--|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFI0619-BLK1)</b>   |        |                 |       | Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 10:10                    |               |      |             |       |           |       |
| Total Carbon  | ND     | 0.02            | %     |  |               |      |             |       |           | U     |
| Total Solids  | ND     | 0.04            | %     |  |               |      |             |       |           | U     |
| <b>Blank (BFI0619-BLK2)</b>   |        |                 |       | Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 09:09                    |               |      |             |       |           |       |
| Total Organic Carbon  | ND     | 0.02            | %     |  |               |      |             |       |           | U     |
| <b>Duplicate (BFI0619-DUP1)</b>   |        |                 |       | Source: 17I0272-01 Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 14:41 |               |      |             |       |           |       |
| Total Carbon  | 0.08   | 0.02            | %     |  | 0.07          |      |             | 13.10 | 20        |       |
| Total Solids  | 80.63  | 0.04            | %     |  | 80.22         |      |             | 0.51  | 20        |       |
| <b>Duplicate (BFI0619-DUP2)</b>   |        |                 |       | Source: 17I0272-01 Prepared: 25-Sep-2017 Analyzed: 26-Sep-2017 12:10 |               |      |             |       |           |       |
| Total Solids  | 79.90  | 0.04            | %     |  | 80.22         |      |             | 0.41  | 20        |       |
| <b>Duplicate (BFI0619-DUP3)</b>   |        |                 |       | Source: 17I0272-01 Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 14:58 |               |      |             |       |           |       |
| Total Carbon  | 0.10   | 0.02            | %     |  | 0.07          |      |             | 30.50 | 20        | *     |
| <b>Duplicate (BFI0619-DUP4)</b>   |        |                 |       | Source: 17I0272-01 Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 14:48 |               |      |             |       |           |       |
| Total Organic Carbon  | 0.07   | 0.02            | %     |  | 0.08          |      |             | 14.30 | 20        |       |
| <b>Duplicate (BFI0619-DUP5)</b>   |        |                 |       | Source: 17I0272-01 Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 14:56 |               |      |             |       |           |       |
| Total Organic Carbon  | 0.06   | 0.02            | %     |  | 0.08          |      |             | 28.20 | 20        | *     |
| <b>Matrix Spike (BFI0619-MS2)</b>   |        |                 |       | Source: 17I0272-01 Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 15:17 |               |      |             |       |           |       |
| Total Carbon  | 2.44   | 0.02            | %     | 1.76   | 0.07          | 135  | 75-125      |       |           | *     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |                 |       |  |               |      |             |       |           |       |
| <b>Matrix Spike (BFI0619-MS3)</b>   |        |                 |       | Source: 17I0272-01 Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 15:08 |               |      |             |       |           |       |
| Total Organic Carbon  | 2.45   | 0.02            | %     | 1.76   | 0.08          | 135  | 75-125      |       |           | *     |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |                 |       |  |               |      |             |       |           |       |
| <b>Reference (BFI0619-SRM1)</b>   |        |                 |       | Prepared: 25-Sep-2017 Analyzed: 06-Oct-2017 09:20                    |               |      |             |       |           |       |
| Total Organic Carbon  | 2.94   | 0.02            | %     | 2.45   |               | 120  | 75-125      |       |           |       |
| <b>Reference (BFI0619-SRM2)</b>   |        |                 |       | Prepared: 25-Sep-2017 Analyzed: 05-Oct-2017 10:17                    |               |      |             |       |           |       |
| Total Carbon  | 3.21   | 0.02            | %     | 3.35   |               | 95.9 | 80-120      |       |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: 79227  
Project Manager: Troy Bussey Jr.

**Reported:**  
09-Nov-2017 13:58

**Wet Chemistry - Quality Control**

**Batch BFI0624 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: AGW

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFI0624-BLK1)</b> |        |                 |       |             | Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 19:40 |      |             |     |           |       |
| Total Organic Carbon        | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFI0624-BS1)</b>    |        |                 |       |             | Prepared: 25-Sep-2017 Analyzed: 25-Sep-2017 19:59 |      |             |     |           |       |
| Total Organic Carbon        | 19.4   | 0.50            | mg/L  | 20.0        |   | 96.9 | 90-110      |     |           |       |





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Reported:  
09-Nov-2017 13:58

**Certified Analyses included in this Report**

| Analyte                     | Certifications             |
|-----------------------------|----------------------------|
| <b>EPA 300.0 in Solid</b>   |                            |
| Orthophosphorus             | DoD-ELAP,WA-DW,WADOE,NELAP |
| Sulfate                     | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 300.0 in Water</b>   |                            |
| Orthophosphorus             | DoD-ELAP,WADOE,WA-DW,NELAP |
| Sulfate                     | DoD-ELAP,WADOE,WA-DW,NELAP |
| <b>EPA 6010C in Solid</b>   |                            |
| Aluminum                    | NELAP,WADOE,DoD-ELAP       |
| Arsenic                     | NELAP,WADOE,DoD-ELAP,ADEC  |
| Iron                        | NELAP,WADOE,DoD-ELAP       |
| Manganese                   | NELAP,WADOE,DoD-ELAP       |
| Silver                      | NELAP,WADOE,DoD-ELAP       |
| Arsenic                     | CALAP,NELAP,WADOE          |
| Barium                      | CALAP,NELAP,WADOE          |
| Cadmium                     | NELAP,WADOE,DoD-ELAP       |
| Chromium                    | NELAP,WADOE,DoD-ELAP       |
| Lead                        | NELAP,WADOE,DoD-ELAP       |
| Selenium                    | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 6010C in Water</b>   |                            |
| Aluminum                    | WADOE,NELAP,DoD-ELAP       |
| Arsenic                     | WADOE,NELAP,ADEC,DoD-ELAP  |
| Iron                        | WADOE,NELAP,DoD-ELAP       |
| Manganese                   | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 7470A in Solid</b>   |                            |
| Mercury                     | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9040C in Water</b>   |                            |
| pH                          | CALAP,WADOE,NELAP          |
| <b>EPA 9045D in Solid</b>   |                            |
| pH                          | WADOE,CALAP,DoD-ELAP,NELAP |
| <b>EPA 9060A in Water</b>   |                            |
| Total Organic Carbon        | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 9060A m in Solid</b> |                            |
| Total Organic Carbon        | WADOE                      |



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**Reported:**  
09-Nov-2017 13:58

**SM 4500-S2 D-00 in Solid**

Sulfide DoD-ELAP,NELAP,WADOE

**SM 4500-S2 D-00 in Water**

Sulfide DoD-ELAP,WADOE,NELAP

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



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Olympia WA, 98503

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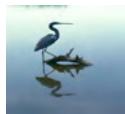
Reported:  
09-Nov-2017 13:58

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- H Hold time violation - Hold time was exceeded.
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.

**Data Gap #2D**  
**2017 Sediment Samples (ARI)**

## QA/QC Solutions, LLC



James J. Mc Ateer, Jr., Managing Member  
7532 Champion Hill Rd. SE  
Salem, Oregon 97306  
Telephone: 503.763.6948  
Facsimile: 503.566.2114  
Cellular: 503.881.1501  
email: jjmcateer@msn.com

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November 20, 2017

Troy Bussey Jr., P.E.  
PIONEER Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, Washington 98503

Subject: Feasibility Study Data Gap Investigation, Former Arkema Manufacturing Site, Tacoma, WA;  
Sediment Sample Data Validation Review Summary  
Client Project No.: Not Specified  
QA/QC Solutions, LLC Project No.: 092317.1

Dear Troy:

This letter documents the results of the data validation review of the conventional parameter and metal analyses completed on sediment samples associated with Feasibility Study Data Gap Investigation completed at the Former Arkema Manufacturing Site located in Tacoma, Washington. Details of the investigation completed are provided in the FS Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. (Pioneer 2017).

The data reported were validated to verify the laboratory quality assurance and quality control (QA/QC) procedures were documented and that the overall quality of the data reported is sufficient to support its intended purposes. A summary of the data set, the analytical methods used to complete the chemical analyses, the data validation procedures used, and the overall assessment of data quality is presented below.

### **Data Set**

The data set consisted of 8 sediment samples, one field duplicate, and one equipment rinsate blank that were submitted to the laboratory. Samples were collected during the month of October 2017. A summary of the samples collected and the analyses completed is presented in Table 1.

*\* Data users must note that only data considered reportable during data validation has been reported. In several instances, multiple reanalysis were completed.*

Analyses were completed by Analytical Resources, Inc. (ARI) located in Tukwila, Washington under the following two (2) work orders: 17J0037, and 17J0062. ARI submitted a electronic data deliverables (EDDs that included only a summary of sample and QC-related results and a data file summarizing the results of the data reported.

### **Analytical Methods**

The analytical methods that were used to complete the chemical analyses included the following:

- Total solids by desiccation and gravimetric determination using Standard Method SM 2540 G-97 (APHA 2012) and PSEP 1986 (for samples analyzed for sulfide).
- Total Aluminum, arsenic, iron, and manganese on sediment samples by digestion and analysis by inductively coupled plasma-atomic emission spectrometry (ICP-AES) using on sediment samples SW-846 methods 3050B and 6010C (SW-846 2017), respectively.
- Total Aluminum, arsenic, iron, and manganese on the equipment rinsate blank by digestion and analysis by ICP-AES using SW-846 methods 3010A and 6010C (SW-846 2017), respectively.
- Orthophosphorus and sulfate on sediment samples and the equipment rinsate blank by ion chromatography using EPA Method 300.0 (U.S. EPA 1993).
- pH by electrochemical determination using SW-846 Method 9045D (U.S. EPA 2017) on sediment samples and SW-846 Method 9040C (U.S. EPA 2017) on the equipment rinsate blank.
- Total carbon, total organic carbon, and total inorganic carbon on sediment samples by catalytic combustion using infrared detection using a modified version of SW-846 Method 9060A (U.S. EPA 2017) per the laboratory standard operating procedure; SW-846 Method 9060A was without modification for the analysis of the equipment rinsate blank.
- Total sulfide on sediment samples and the equipment rinsate blank with sample preparation by distillation (Plumb 1981) and analysis by spectrophotometry using SM 4500-S2 D-00 (APHA 2012).

## Data Validation Procedures

Data validation procedures included evaluating a summary of the sample results and applicable quality control results that were reported by the laboratory; this level of validation is also referred to as an abbreviated data review (equivalent to “Stage 2B” review per U.S. EPA 2009, which is equivalent to “Level EPA2B” for use with the Washington Department of Ecology EIMS database). The analytical data were validated generally following the applicable guidance and requirements:

- *Guidance on Environmental Data Verification and Validation* (U.S. EPA 2002)
- *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use*. OSWER No. 9200.1-85. EPA 540-R-08-005. (U.S. EPA 2009).
- *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review*. Final. OSWER 9240.1-51. EPA 540-R-10-011 (U.S. EPA 2010).
- Method-specific and laboratory-established quality control requirements, as applicable.

Data validation procedures were modified to accommodate QA/QC requirements for methods (e.g., conventional parameters) that are not specifically addressed by the USEPA functional guidelines. In this situation, method-specific and laboratory-established control limits were used, as necessary, to determine if qualification of the data was necessary. The laboratory data deliverables that were validated, if present, included the following:

- Case narratives discussing analytical problems (if any) and procedures.
- Chain-of-custody documentation to verify completeness of the data set.
- Results for applicable method blanks and field blanks to determine whether an analyte that was reported as detected in any sample was the result of possible contamination introduced at the laboratory or during field sampling, respectively.
- Results for applicable standard reference material (SRM), laboratory control sample (LCS) (i.e., blank spike), duplicate LCS, matrix spike (MS), and/or matrix spike duplicate (MSD) recoveries to assess analytical accuracy.
- Results for applicable laboratory duplicate sample, duplicate LCS, and/or MSD analyses to assess analytical precision.
- Results for the field duplicate samples to provide additional information in support of the quality assurance review.
- Laboratory summaries of analytical results.

Verification applicable laboratory calculations, transcriptions, review of instrument printouts, and review of bench sheets were not completed during data validation effort per the requirements specified in the work plan (Pioneer 2017). All data subjected to the abbreviated data validation review completed may have analytical problems that can only be identified by completing a 100-percent review of all original instrument printouts and associated analytical quality control results. Verification of all possible factors that could result in the degradation of data quality cannot be made nor should be inferred based on the results of an abbreviated validation effort. The adequacy of the sampling procedures will not be completed during data validation. *QA/QC Solutions, LLC* will not be responsible for any qualitative and quantitative errors that may be reported by the laboratory.

Performance based control limits established by the laboratory and control limits provided in the method protocols will be used to evaluate data quality and determine the need for data qualification. Applicable laboratory control limits for surrogate compound recoveries, LCSs and LCS duplicate recoveries, and MS/MSD recoveries will be used during data validation. Data qualifiers will be assigned during data validation to the EDD when applicable QA/QC limits are not met and qualification of the data is warranted. Data qualifiers will be assigned following guidance specified by U.S. EPA (2002, 2009, and 2010) and using professional judgment.

## Overall Assessment of Data Quality

Overall, the data reported are of good quality and the results for the applicable QA/QC procedures that were used by the laboratory during the analysis of the samples were generally acceptable. Selected sample results required qualification during data validation because method-specific QA/QC criteria were not met; results maybe qualified for more than one reason. During data validation, the following actions were taken:

- A total of 40 results reported as detected were qualified as estimated (assigned a *J* qualifier).
- No results were qualified as undetected and estimated (assigned a *UJ* qualifier).
- No results were restated as undetected (assigned a *U* qualifier).

- No results required rejection (*R*).

Analytical data that did not meet method- and/or laboratory-established control limits for applicable quality control measurements were qualified as estimated (*J or UJ*) by the laboratory or during data validation. These qualified data usable and represent data of good quality and reasonable confidence and have an acceptable degree of uncertainty (i.e., may be less precise or less accurate than unqualified data). Analytical data that were reported as undetected (*U*) by the laboratory or that were restated as undetected (*U*) during data validation are usable. A summary of the qualified sample data and the reason(s) for qualification is presented in Table 2; results may be qualified for more than one reason).

In some instances, selected samples required dilution prior to analysis (as is required by the analytical methods) to obtain concentrations that were within the linear range of the instrument or to minimize the effects of matrix interferences to obtain reportable results.

This concludes the data validation review summary. Should you have any questions regarding the information presented herein, please contact me by telephone at 503.763.6948 or by e-mail at [jjmcateer@msn.com](mailto:jjmcateer@msn.com).

Cordially,



*QA/QC Solutions, LLC*

James J. Mc Ateer, Jr., Managing Member

Attachments



## **References**

APHA. 2012. Standard methods for the analysis of water and wastewater. 22<sup>nd</sup> ed. American Public Health Association, American Water Works Association, Water Environment Federation, Washington, DC.

Pioneer 2017. FS Data Gap Investigation Work Plan, Former Arkema Manufacturing Site. February 2017. Prepared for Port of Tacoma. Prepared by Pioneer Technologies Corporation.

PSEP. 1986. Recommended protocols for measuring conventional sediment variables in Puget Sound. Prepared for U.S. Environmental Protection Agency Region 10, Office of Puget Sound, Seattle, WA.

U.S. EPA. 1993. Methods for the determination of inorganic substances in environmental samples. EPA/600/R-93/100. August 1993. U.S. Environmental Protection Agency, Office of Research and Development, Washington, DC.

Plumb, R.H., Jr. 1981. Procedures for handling and chemical analyses of sediment and water samples. Technical Report EPA/CE-81-1. U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, Waterways Experiment Station, Vicksburg, MS.

U.S. EPA 2002. Guidance on Environmental Data Verification and Data Validation. EPA QA/G-8. EPA/240/R-02/004. November 2002. U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC.

U.S. EPA 2009. Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use. OSWER No. 9200.1-85. EPA 540-R-08-005. January 13, 2009. U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, DC.

U.S. EPA 2010. USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Superfund Data Review. Final. OSWER 9240.1-51. EPA 540-R-10-011. January 2010. U.S. Environmental Protection Agency, Office of Superfund Remediation and Technology Innovation (OSRTI), Washington, DC.

U.S. EPA 2017. SW-846 on-line. Test methods for evaluating solid wastes, physical/chemical methods. <https://www.epa.gov/hw-sw846/sw-846-compendium> (last updated on February 22, 2017). U.S. Environmental Protection Agency, Office of Solid Waste, Washington, DC

**Table 1. Summary of Samples Collected and Analyses Completed**

| Sample Number                   | Laboratory Sample Number             | Sample Date | Total Solids by SM 2540 G-97 | Total Aluminum, Arsenic, Iron, and Manganese by SW-846 3050B and 6010C | Orthophosphorus and Sulfate by EPA 300.0 | pH by SW-846 9045D | Total Organic Carbon by SW-846 9060A (mod) | Total Inorganic Carbon by SW-846 9060A (mod) | Total Carbon by calculation | Total Solids, Sulfide by PSEP 1986 | Total Sulfide by SM 4500-S2 D-00 |
|---------------------------------|--------------------------------------|-------------|------------------------------|--|--|--------------------|--|--|-----------------------------|------------------------------------|----------------------------------|
| <b>Work Order 17J0037</b>       |                                      |             |                              |  |  |                    |  |  |                             |                                    |                                  |
| 17J0037-01                      | SD-122+60-0-SED-100317-0-0.33        | 10/03/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| 17J0037-02                      | SD-124+00-0-SED-100317-0-0.33        | 10/03/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| 17J0037-03                      | SD-125+50-0-SED-100317-0-0.33        | 10/03/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| 17J0037-04                      | SD-126+90-0-SED-100317-0-0.33        | 10/03/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| 17J0037-05                      | SD-128+30-0-SED-100317-0-0.33        | 10/03/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| <b>Work Order 17J0062</b>       |                                      |             |                              |  |  |                    |  |  |                             |                                    |                                  |
| 17J0062-01                      | SD-120+75-ST1-SED-100417-0-0.33      | 10/04/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| 17J0062-02                      | SD-125+00-ST1-SED-100417-0-0.33      | 10/04/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| 17J0062-03                      | SD-128+50-ST1-SED-100417-0-0.33      | 10/04/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| 17J0062-04                      | SD-128+50-ST1-SED-100417-0-0.33-(01) | 10/04/17    | ✓                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| 17J0062-05                      | EB-EB-2-100417 (aqueous blank)*      | 10/04/17    | -                            | ✓  | ✓  | ✓                  | ✓  | ✓  | ✓                           | ✓                                  | ✓                                |
| <b>Total Number of Samples:</b> |                                      |             | 9                            | 10   | 10                                       | 10                 | 10   | 10   | 10                          | 10                                 | 10                               |

**Notes**

\*- see report for method reference since this is an aqueous sample

Table 2. Summary of Qualified Data

| Sample Number* | Laboratory Sample Number             | Chemical                           | Concentration | Units    | MDL  | RL    | Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result                                   | Possible Bias <sup>b,c,d</sup> |
|----------------|--------------------------------------|------------------------------------|---------------|----------|------|-------|----------------------|---------------------------|--|--|--------------------------------|
| 17J0062-05     | EB-EB-2-100417                       | pH                                 | 6.82          | pH Units | 0.01 | 0.01  | H                    | J                         | Method-required hold time constraint not met   | pH was not determined within 15 mins. of collection      | Low or high                    |
| 17J0037-01RE2  | SD-122+60-0-SED-100317-0-0.33        | Sulfate                            | 450           | mg/kg    | 10.7 | 190.7 | D, B                 | J                         | RPD of laboratory duplicate analysis was above control limit of 20 and matrix spike recovery below lower control limit of 75 percent   | RPD = 29.2 and matrix spike recovery = 23.2 percent      | Low or high                    |
| 17J0037-02RE2  | SD-124+00-0-SED-100317-0-0.33        | Sulfate                            | 474           | mg/kg    | 10.9 | 10.9  | D, B                 | J                         | RPD of laboratory duplicate analysis was above control limit of 20 and matrix spike recovery below lower control limit of 75 percent   | RPD = 29.2 and matrix spike recovery = 23.2 percent      | Low or high                    |
| 17J0037-03RE2  | SD-125+50-0-SED-100317-0-0.33        | Sulfate                            | 267           | mg/kg    | 10.6 | 10.6  | D, B                 | J                         | RPD of laboratory duplicate analysis was above control limit of 20 and matrix spike recovery below lower control limit of 75 percent   | RPD = 29.2 and matrix spike recovery = 23.2 percent      | Low or high                    |
| 17J0037-04     | SD-126+90-0-SED-100317-0-0.33        | Sulfate                            | 169           | mg/kg    | 4.73 | 4.73  | E, D, B              | J                         | Concentration exceeds upper calibration range of instrument (dilution not completed by lab), RPD of laboratory duplicate analysis was above control limit of 20, and matrix spike recovery below lower control limit of 75 percent | NA, RPD = 29.2, and matrix spike recovery = 23.2 percent | Low or high                    |
| 17J0037-05RE2  | SD-128+30-0-SED-100317-0-0.33        | Sulfate                            | 437           | mg/kg    | 11.1 | 11.1  | D, B                 | J                         | RPD of laboratory duplicate analysis was above control limit of 20 and matrix spike recovery below lower control limit of 75 percent   | RPD = 29.2 and matrix spike recovery = 23.2 percent      | Low or high                    |
| 17J0062-01RE1  | SD-120+75-ST1-SED-100417-0-0.33      | Sulfate                            | 624           | mg/kg    | 21.9 | 21.9  | D                    | J                         | RPD of laboratory duplicate analysis was above control limit of 20   | RPD = 40.1   | Low or high                    |
| 17J0062-02RE1  | SD-125+00-ST1-SED-100417-0-0.33      | Sulfate                            | 275           | mg/kg    | 9.75 | 9.75  | D                    | J                         | RPD of laboratory duplicate analysis was above control limit of 20   | RPD = 40.1   | Low or high                    |
| 17J0062-03RE1  | SD-128+50-ST1-SED-100417-0-0.33      | Sulfate                            | 1130          | mg/kg    | 27.4 | 27.4  | D                    | J                         | RPD of laboratory duplicate analysis was above control limit of 20   | RPD = 40.1   | Low or high                    |
| 17J0062-04RE1  | SD-128+50-ST1-SED-100417-0-0.33-(01) | Sulfate                            | 1310          | mg/kg    | 72.8 | 72.8  | D                    | J                         | RPD of laboratory duplicate analysis was above control limit of 20   | RPD = 40.1   | Low or high                    |
| 17J0037-01RE1  | SD-122+60-0-SED-100317-0-0.33        | Total Carbon (Elemental + Organic) | 0.13          | percent  | 0.02 | 0.02  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |
|                |                                      | Inorganic Carbon                   | 0.0550        | percent  | 0.04 | 0.04  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |
|                |                                      | Total Organic Carbon               | 0.07          | percent  | 0.02 | 0.02  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |
| 17J0037-02     | SD-124+00-0-SED-100317-0-0.33        | Total Carbon (Elemental + Organic) | 0.19          | percent  | 0.02 | 0.02  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |
|                |                                      | Inorganic Carbon                   | 0.0461        | percent  | 0.04 | 0.04  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |
|                |                                      | Total Organic Carbon               | 0.15          | percent  | 0.02 | 0.02  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |
| 17J0037-03     | SD-125+50-0-SED-100317-0-0.33        | Total Carbon (Elemental + Organic) | 0.27          | percent  | 0.02 | 0.02  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |
|                |                                      | Inorganic Carbon                   | 0.0988        | percent  | 0.04 | 0.04  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |
|                |                                      | Total Organic Carbon               | 0.17          | percent  | 0.02 | 0.02  |                      | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20   | RPDs = 29.3 and 43.9                                     | Low or high                    |

**Table 2. Summary of Qualified Data**

| Sample Number*     | Laboratory Sample Number             | Chemical                           | Concentration | Units   | MDL    | RL     | Data Laboratory Data Flag | Data Validation Qualifier | Quality Control Reason   | Quality Control Result  | Possible Bias <sup>b,c,d</sup> |             |
|--------------------|--------------------------------------|------------------------------------|---------------|---------|--------|--------|---------------------------|---------------------------|--|-------------------------|--------------------------------|-------------|
| 17J0037-04         | SD-126+90-0-SED-100317-0-0.33        | Total Carbon (Elemental + Organic) | 0.41          | percent | 0.02   | 0.02   |                           | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20 | RPDs = 29.3 and 43.9    | Low or high                    |             |
|                    |                                      | Inorganic Carbon                   | 0.231         | percent | 0.04   | 0.04   |                           | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20 | RPDs = 29.3 and 43.9    | Low or high                    |             |
|                    |                                      | Total Organic Carbon               | 0.18          | percent | 0.02   | 0.02   |                           | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20 | RPDs = 29.3 and 43.9    | Low or high                    |             |
| 17J0037-05         | SD-128+30-0-SED-100317-0-0.33        | Total Carbon (Elemental + Organic) | 0.26          | percent | 0.02   | 0.02   |                           | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20 | RPDs = 29.3 and 43.9    | Low or high                    |             |
|                    |                                      | Inorganic Carbon                   | 0.0975        | percent | 0.04   | 0.04   |                           | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20 | RPDs = 29.3 and 43.9    | Low or high                    |             |
|                    |                                      | Total Organic Carbon               | 0.16          | percent | 0.02   | 0.02   |                           | J                         | Total organic carbon RPD of laboratory duplicate analyses were above control limit of 20 | RPDs = 29.3 and 43.9    | Low or high                    |             |
| 17J0062-01         | SD-120+75-ST1-SED-100417-0-0.33      | Total Carbon (Elemental + Organic) | 0.49          | percent | 0.02   | 0.02   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
|                    |                                      | Inorganic Carbon                   | 0.308         | percent | 0.04   | 0.04   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
|                    |                                      | Total Organic Carbon               | 0.18          | percent | 0.02   | 0.02   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
| 17J0062-02         | SD-125+00-ST1-SED-100417-0-0.33      | Total Carbon (Elemental + Organic) | 0.18          | percent | 0.02   | 0.02   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
|                    |                                      | Inorganic Carbon                   | 0.0498        | percent | 0.04   | 0.04   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
|                    |                                      | Total Organic Carbon               | 0.13          | percent | 0.02   | 0.02   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
| 17J0062-03         | SD-128+50-ST1-SED-100417-0-0.33      | Total Carbon (Elemental + Organic) | 0.96          | percent | 0.02   | 0.02   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
|                    |                                      | Inorganic Carbon                   | 0.402         | percent | 0.04   | 0.04   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
|                    |                                      | Total Organic Carbon               | 0.55          | percent | 0.02   | 0.02   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
| 17J0062-04         | SD-128+50-ST1-SED-100417-0-0.33-(01) | Total Carbon (Elemental + Organic) | 0.62          | percent | 0.02   | 0.02   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
|                    |                                      | Inorganic Carbon                   | 0.172         | percent | 0.04   | 0.04   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
|                    |                                      | Total Organic Carbon               | 0.44          | percent | 0.02   | 0.02   |                           | J                         | No duplicate QC data for total carbon and total organic carbon                           | NA                      | Indeterminate                  |             |
| <b>Metals Data</b> |                                      |                                    |               |         |        |        |                           |                           |  |                         |                                |             |
| 17J0037-01         | SD-122+60-0-SED-100317-0-0.33        | Arsenic, Inorganic                 | 3.60          | mg/kg   | 0.313  | 5.59   |                           | J                         | J  | Concentration >MDL, <RL | NA                             | Low or high |
| 17J0062-05         | EB-EB-2-100417                       | Iron                               | 0.0094        | mg/al   | 0.0013 | 0.0500 |                           | J                         | J  | Concentration >MDL, <RL | NA                             | Low or high |
|                    |                                      | Manganese                          | 0.0005        | mg/L    | 0.0003 | 0.0010 |                           | J                         | J  | Concentration >MDL, <RL | NA                             | Low or high |

**Notes:**

- E - concentration exceeded calibration range
- H - holding time not met
- J - estimated
- MDL - method detection limit
- RL - reporting limit
- RPDs - relative percent differences
- U - undetected at detection limit shown

|                                |    |
|--------------------------------|----|
| Total results qualified "J" =  | 40 |
| Total results qualified "U" =  | 0  |
| Total results qualified "UJ" = | 0  |
| Total results qualified "R" =  | 0  |

\* Summary of qualified data is for natural and field quality control samples only

<sup>b</sup>Low bias - concentration reported is exhibits low bias and the actual reporting limit or concentration may be greater than reported

<sup>c</sup>High bias - result reported exhibits high bias and the actual reporting limit or concentration may be lower than reported

<sup>d</sup>False positive - compound is likely not present

\* Data users must note that only data considered reportable during data validation has been reported. In several instances, multiple reanalysis were completed.



20 October 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)  
17J0037

Associated SDG ID(s)  
N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*





**Chain of Custody Record & Laboratory Analysis Request**

Analytical Resources, Incorporated  
 Analytical Chemists and Consultants  
 4611 South 134th Place, Suite 100  
 Tukwila, WA 98168  
 206-695-6200 206-695-6201 (fax)



Date: 10/03/2017 of 1  
 Page: 1  
 No. of Coolers: 1  
 Cooler Temps:

ARI Assigned Number: 17J0037  
 Turn-around Requested: Normal  
 ARI Client Company: Pioneer Technologies  
 Phone: 360-570-1700  
 Client Contact: Troy Bussey  
 Client Project Name: Former Arkema Manufacturing Site  
 Client Project #: DG Cooper 206-660-3466  
 Samplers: DG Cooper 206-660-3466

| Sample ID                           | Date            | Time         | Matrix     | No. Containers              | Analysis Requested               |  |                |                              |  |                           | Notes/Comments |                             |
|-------------------------------------|-----------------|--------------|------------|-----------------------------|----------------------------------|--|----------------|------------------------------|--|---------------------------|----------------|-----------------------------|
|                                     |                 |              |            |                             | Total Arsenic<br>EPA 3050B/6010C | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Si<br>EPA 1311/6010C/7470A | pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 3050/6010C | Sulfate, Ortho-phosphorus<br>EPA 300.0 | TOC, TIC<br>EPA 9060A Mod |                | Sulfide<br>SM 4500-S2(PESP) |
| <u>SD-122-160-0-SD-100317-0-033</u> | <u>10/17/17</u> | <u>10:20</u> | <u>SOL</u> | <u>1 - 16oz<br/>1 - 2oz</u> | <u>X</u>                         | <u>X</u>   | <u>X</u>       | <u>X</u>                     | <u>X</u>                               | <u>X</u>                  | <u>X</u>       |                             |
| <u>SD-122-160-0-SD-100317-0-033</u> | <u>10:30</u>    | <u>10:30</u> | <u>SOL</u> | <u>1 - 16oz<br/>1 - 2oz</u> | <u>X</u>                         | <u>X</u>   | <u>X</u>       | <u>X</u>                     | <u>X</u>                               | <u>X</u>                  | <u>X</u>       |                             |
| <u>SD-122-160-0-SD-100317-0-033</u> | <u>9:50</u>     | <u>9:50</u>  | <u>SOL</u> | <u>1 - 16oz<br/>1 - 2oz</u> | <u>X</u>                         | <u>X</u>   | <u>X</u>       | <u>X</u>                     | <u>X</u>                               | <u>X</u>                  | <u>X</u>       |                             |
| <u>SD-122-160-0-SD-100317-0-033</u> | <u>10:35</u>    | <u>10:35</u> | <u>SOL</u> | <u>1 - 16oz<br/>1 - 2oz</u> | <u>X</u>                         | <u>X</u>   | <u>X</u>       | <u>X</u>                     | <u>X</u>                               | <u>X</u>                  | <u>X</u>       |                             |
| <u>SD-122-160-0-SD-100317-0-033</u> | <u>10:40</u>    | <u>10:40</u> | <u>SOL</u> | <u>1 - 16oz<br/>1 - 2oz</u> | <u>X</u>                         | <u>X</u>   | <u>X</u>       | <u>X</u>                     | <u>X</u>                               | <u>X</u>                  | <u>X</u>       |                             |

Relinquished by: (Signature) [Signature] Received by: (Signature) [Signature]  
 Printed Name: Luke Kern Printed Name: Stephanie Fisher  
 Company: DOF Company: ARI  
 Date & Time: 10/31/17 12:55 Date & Time: 10/31/17 12:58

**Terms of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by workorder or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Cooler Receipt Form

ARI Client: Pioneer

Project Name: Former Arkema Manufacturing Site

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 1750037

Tracking No: \_\_\_\_\_ NA

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time: 1258 11.3

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: SF Date: 10/3/17 Time: 1258

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA YES  NO

Were all VOC vials free of air bubbles? ..... NA YES  NO

Was sufficient amount of sample sent in each bottle? ..... YES  NO

Date VOC Trip Blank was made at ARI..... NA

Was Sample Split by ARI : NA YES  Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: B.H. Date: 10/4/17 Time: 16:27

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

*Additional Notes, Discrepancies, & Resolutions:*

By: \_\_\_\_\_ Date: \_\_\_\_\_

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



# Cooler Temperature Compliance Form

1750037

| Cooler#:                  |              | Temperature(°C): |  |
|---------------------------|--------------|------------------|--|
| Sample ID                 | Bottle Count | Bottle Type      |  |
| Samples received above 6° |              |                  |  |
|                           |              |                  |  |
|                           |              |                  |  |
|                           |              |                  |  |
|                           |              |                  |  |
|                           |              |                  |  |
|                           |              |                  |  |

| Cooler#:  |              | Temperature(°C): |  |
|-----------|--------------|------------------|--|
| Sample ID | Bottle Count | Bottle Type      |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |

| Cooler#:  |              | Temperature(°C): |  |
|-----------|--------------|------------------|--|
| Sample ID | Bottle Count | Bottle Type      |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |

| Cooler#:  |              | Temperature(°C): |  |
|-----------|--------------|------------------|--|
| Sample ID | Bottle Count | Bottle Type      |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |
|           |              |                  |  |

Completed by: SF Date: 10/31/17 Time: 12:50





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                     | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|-------------------------------|---------------|--------|-------------------|-------------------|
| SD-122+60-0-SED-100317-0-0.33 | 17J0037-01    | Solid  | 03-Oct-2017 10:20 | 03-Oct-2017 12:58 |
| SD-124+00-0-SED-100317-0-0.33 | 17J0037-02    | Solid  | 03-Oct-2017 10:30 | 03-Oct-2017 12:58 |
| SD-125+50-0-SED-100317-0-0.33 | 17J0037-03    | Solid  | 03-Oct-2017 09:20 | 03-Oct-2017 12:58 |
| SD-126+90-0-SED-100317-0-0.33 | 17J0037-04    | Solid  | 03-Oct-2017 10:35 | 03-Oct-2017 12:58 |
| SD-128+30-0-SED-100317-0-0.33 | 17J0037-05    | Solid  | 03-Oct-2017 10:40 | 03-Oct-2017 12:58 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 3, 2017 under ARI workorder 17J0037. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total Metals - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank has Aluminum detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. The method blank also has Iron detected below the reporting limit, but above the method detection limit. The Iron has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

### Anions - EPA Method 300.0

The samples were prepared and analyzed within the recommended holding times.

The method blank has Sulfate detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SD-122+60-0-SED-100317-0-0.33. The matrix spike has low spike recovery for Sulfate, and the duplicate has a high RPD for Sulfate. This is likely due to matrix interference. The results are advisory. No corrective action was taken.

### Total Organic Carbon/Total Carbon - EPA Method 9060A

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with the re-analysis of sample SD-122+60-0-SED-100317-0-0.33. The duplicate has a high RPD for TOC. The matrix spike percent recoveries were within QC limits. The results are advisory. No corrective action was taken.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

#### **Sulfide - Method SM4500**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with sample SD-122+60-0-SED-100317-0-0.33. The duplicate has high RPD for Sulfide. The matrix spike has low spike recovery. This is likely due to matrix interference. The results are advisory. No corrective action was taken.

#### **pH - EPA Method 9045**

The samples were prepared and analyzed within the recommended holding times.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample SD-122+60-0-SED-100317-0-0.33. The duplicate RPD was within QC limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**SD-122+60-0-SED-100317-0-0.33**  
**17J0037-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/03/2017 10:20  
Analyzed: 12-Oct-2017 17:32

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.068 g (wet) Dry Weight: 0.89 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 83.73

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.562           | 5.59            | <b>17100</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.313           | 5.59            | <b>3.60</b>  | mg/kg | J     |
| Iron      | 7439-89-6  | 2        | 0.403           | 5.59            | <b>23300</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0124          | 0.112           | <b>540</b>   | mg/kg |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-122+60-0-SED-100317-0-0.33**  
**17J0037-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 10/03/2017 10:20

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 14:07

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFJ0293

Prepared: 11-Oct-2017

Sample Size: 20.7 g (wet)

Final Volume: 20 mL

Dry Weight: 17.33 g

% Solids: 83.73

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 7.57   | pH Units |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-122+60-0-SED-100317-0-0.33**  
**17J0037-01 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/03/2017 10:20  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 4.19 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 83.73

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>82.2</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-122+60-0-SED-100317-0-0.33**  
**17J0037-01 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/03/2017 10:20  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.84 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 83.73

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>83.73</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-122+60-0-SED-100317-0-0.33**  
**17J0037-01 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/03/2017 10:20  
Analyzed: 10-Oct-2017 18:00

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.033 g (wet) Dry Weight: 4.21 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 83.73

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.19            | <b>3.61</b> | mg/kg |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-122+60-0-SED-100317-0-0.33**  
**17J0037-01RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 10:20  
Analyzed: 05-Oct-2017 09:22

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.45 g (wet) Dry Weight: 3.73 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 83.73

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 2.15            | ND     | mg-P/kg | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**SD-122+60-0-SED-100317-0-0.33**  
**17J0037-01RE1 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/03/2017 10:20  
Analyzed: 20-Oct-2017 11:45

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 83.73

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0550</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 11:36

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.84 g  
% Solids: 83.73

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.13</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 11:45

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.84 g  
% Solids: 83.73

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.07</b> | %     |       |



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5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-122+60-0-SED-100317-0-0.33**  
**17J0037-01RE2 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 10:20  
Analyzed: 05-Oct-2017 16:38

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.45 g (wet) Dry Weight: 3.73 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 83.73

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 10.7            | <b>450</b> | mg/kg | D, B  |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**SD-124+00-0-SED-100317-0-0.33**  
**17J0037-02 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/03/2017 10:30  
Analyzed: 12-Oct-2017 18:15

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.012 g (wet) Dry Weight: 0.85 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 84.28

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.589           | 5.86            | <b>15000</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.329           | 5.86            | <b>12.6</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.423           | 5.86            | <b>22500</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0130          | 0.117           | <b>512</b>   | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-124+00-0-SED-100317-0-0.33**  
**17J0037-02 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 10/03/2017 10:30

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 14:07

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFJ0293

Prepared: 11-Oct-2017

Sample Size: 20.02 g (wet)

Final Volume: 20 mL

Dry Weight: 16.87 g

% Solids: 84.28

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 7.75   | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**SD-124+00-0-SED-100317-0-0.33**  
**17J0037-02 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/03/2017 10:30  
Analyzed: 20-Oct-2017 12:20

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 84.28

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0461</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 12:35

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.84 g  
% Solids: 84.28

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.19</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 12:20

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.84 g  
% Solids: 84.28

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.15</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-124+00-0-SED-100317-0-0.33**  
**17J0037-02 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/03/2017 10:30  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 4.21 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 84.28

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>82.2</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-124+00-0-SED-100317-0-0.33**  
**17J0037-02 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/03/2017 10:30  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.84 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 84.28

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>84.28</b> | %     |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-124+00-0-SED-100317-0-0.33**  
**17J0037-02 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/03/2017 10:30  
Analyzed: 10-Oct-2017 18:02

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.086 g (wet) Dry Weight: 4.29 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 84.28

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.17            | ND     | mg/kg | U     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-124+00-0-SED-100317-0-0.33**  
**17J0037-02RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 10:30  
Analyzed: 05-Oct-2017 09:55

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.35 g (wet) Dry Weight: 3.67 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 84.28

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 2.18            | <b>3.11</b> | mg-P/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-124+00-0-SED-100317-0-0.33**  
**17J0037-02RE2 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 10:30  
Analyzed: 05-Oct-2017 17:28

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.35 g (wet) Dry Weight: 3.67 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 84.28

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 10.9            | 474    | mg/kg | D, B  |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-125+50-0-SED-100317-0-0.33**  
**17J0037-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/03/2017 09:20  
Analyzed: 12-Oct-2017 18:19

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.027 g (wet) Dry Weight: 0.91 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 88.92

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.550           | 5.48            | <b>12100</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.307           | 5.48            | <b>42.2</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.395           | 5.48            | <b>19300</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0121          | 0.110           | <b>438</b>   | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-125+50-0-SED-100317-0-0.33**  
**17J0037-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 10/03/2017 09:20

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 14:07

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFJ0293

Prepared: 11-Oct-2017

Sample Size: 21.38 g (wet)

Final Volume: 20 mL

Dry Weight: 19.01 g

% Solids: 88.92

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.009           | 7.75   | pH Units |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**SD-125+50-0-SED-100317-0-0.33**  
**17J0037-03 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/03/2017 09:20  
Analyzed: 20-Oct-2017 12:26

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 88.92

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0988</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 12:58

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.89 g  
% Solids: 88.92

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.27</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 12:26

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.89 g  
% Solids: 88.92

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.17</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-125+50-0-SED-100317-0-0.33**  
**17J0037-03 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/03/2017 09:20  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 4.45 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 88.92

| Analyte               | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|-----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | 77.0   | %     |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-125+50-0-SED-100317-0-0.33**  
**17J0037-03 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/03/2017 09:20  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.89 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 88.92

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>88.92</b> | %     |       |





Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-125+50-0-SED-100317-0-0.33**  
**17J0037-03 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/03/2017 09:20  
Analyzed: 10-Oct-2017 18:03

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.095 g (wet) Dry Weight: 4.53 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 88.92

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.10            | ND     | mg/kg | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-125+50-0-SED-100317-0-0.33**  
**17J0037-03RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 09:20  
Analyzed: 05-Oct-2017 10:12

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.24 g (wet) Dry Weight: 3.77 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 88.92

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 2.12            | ND     | mg-P/kg | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-125+50-0-SED-100317-0-0.33**  
**17J0037-03RE2 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 09:20  
Analyzed: 05-Oct-2017 17:45

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.24 g (wet) Dry Weight: 3.77 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 88.92

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 10.6            | 267    | mg/kg | D, B  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-126+90-0-SED-100317-0-0.33**  
**17J0037-04 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/03/2017 10:35  
Analyzed: 12-Oct-2017 18:23

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.039 g (wet) Dry Weight: 0.92 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 88.46

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.546           | 5.44            | <b>10800</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.305           | 5.44            | <b>14.9</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.392           | 5.44            | <b>17400</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0120          | 0.109           | <b>361</b>   | mg/kg |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-126+90-0-SED-100317-0-0.33**  
**17J0037-04 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 10:35  
Analyzed: 04-Oct-2017 19:36

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.78 g (wet) Dry Weight: 4.23 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 88.46

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes   |
|---------|------------|----------|-----------------|------------|-------|---------|
| Sulfate | 14808-79-8 | 5        | 4.73            | <b>169</b> | mg/kg | E, D, B |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-126+90-0-SED-100317-0-0.33**  
**17J0037-04 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 10/03/2017 10:35

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 14:07

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFJ0293

Prepared: 11-Oct-2017

Sample Size: 20.89 g (wet)

Final Volume: 20 mL

Dry Weight: 18.48 g

% Solids: 88.46

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 7.74   | pH Units |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**SD-126+90-0-SED-100317-0-0.33**  
**17J0037-04 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/03/2017 10:35  
Analyzed: 20-Oct-2017 13:31

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 88.46

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.231</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 13:19

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.88 g  
% Solids: 88.46

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.41</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 13:31

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.88 g  
% Solids: 88.46

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.18</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-126+90-0-SED-100317-0-0.33**  
**17J0037-04 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/03/2017 10:35  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 4.42 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 88.46

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>83.0</b> | %     |       |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-126+90-0-SED-100317-0-0.33**  
**17J0037-04 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/03/2017 10:35  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.88 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 88.46

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>88.46</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-126+90-0-SED-100317-0-0.33**  
**17J0037-04 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/03/2017 10:35  
Analyzed: 10-Oct-2017 18:03

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.412 g (wet) Dry Weight: 4.79 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 88.46

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.04            | ND     | mg/kg | U     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-126+90-0-SED-100317-0-0.33**  
**17J0037-04RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 10:35  
Analyzed: 05-Oct-2017 10:29

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.78 g (wet) Dry Weight: 4.23 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 88.46

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 1.89            | ND     | mg-P/kg | U     |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-128+30-0-SED-100317-0-0.33**  
**17J0037-05 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/03/2017 10:40  
Analyzed: 12-Oct-2017 18:37

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.04 g (wet) Dry Weight: 0.87 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 83.41

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.579           | 5.76            | <b>14800</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.323           | 5.76            | <b>9.31</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.416           | 5.76            | <b>22400</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0128          | 0.115           | <b>556</b>   | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-128+30-0-SED-100317-0-0.33**  
**17J0037-05 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 10/03/2017 10:40

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 14:07

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFJ0293

Prepared: 11-Oct-2017

Sample Size: 21.67 g (wet)

Final Volume: 20 mL

Dry Weight: 18.08 g

% Solids: 83.41

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.009           | <b>7.80</b> | pH Units |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**SD-128+30-0-SED-100317-0-0.33**  
**17J0037-05 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/03/2017 10:40  
Analyzed: 20-Oct-2017 13:36

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 83.41

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0975</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 13:31

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.83 g  
% Solids: 83.41

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.26</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 13:36

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.83 g  
% Solids: 83.41

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.16</b> | %     |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-128+30-0-SED-100317-0-0.33**  
**17J0037-05 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/03/2017 10:40  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 4.17 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 83.41

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>87.3</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-128+30-0-SED-100317-0-0.33**  
**17J0037-05 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/03/2017 10:40  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.83 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 83.41

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>83.41</b> | %     |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-128+30-0-SED-100317-0-0.33**  
**17J0037-05 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/03/2017 10:40  
Analyzed: 10-Oct-2017 18:22

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.131 g (wet) Dry Weight: 4.28 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 83.41

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.17            | ND     | mg/kg | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-128+30-0-SED-100317-0-0.33**  
**17J0037-05RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 10:40  
Analyzed: 05-Oct-2017 10:46

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.33 g (wet) Dry Weight: 3.61 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 83.41

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 2.21            | <b>2.97</b> | mg-P/kg | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**SD-128+30-0-SED-100317-0-0.33**  
**17J0037-05RE2 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/03/2017 10:40  
Analyzed: 05-Oct-2017 18:02

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0087 Sample Size: 4.33 g (wet) Dry Weight: 3.61 g  
Prepared: 04-Oct-2017 Final Volume: 40 mL % Solids: 83.41

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 11.1            | 437    | mg/kg | D, B  |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0222 - SWC EPA 3050B**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0222-BLK1)</b> |        |                 |                 |       | Prepared: 10-Oct-2017 Analyzed: 11-Oct-2017 17:28 |               |      |             |     |           |       |
| Aluminum                    | 10.1   | 0.502           | 5.00            | mg/kg |   |               |      |             |     |           |       |
| Arsenic                     | ND     | 0.280           | 5.00            | mg/kg |   |               |      |             |     |           | U     |
| Iron                        | 0.438  | 0.361           | 5.00            | mg/kg |   |               |      |             |     |           | J     |
| Manganese                   | ND     | 0.0111          | 0.100           | mg/kg |   |               |      |             |     |           | U     |
| <b>LCS (BFJ0222-BS1)</b>    |        |                 |                 |       | Prepared: 10-Oct-2017 Analyzed: 11-Oct-2017 17:43 |               |      |             |     |           |       |
| Aluminum                    | 206    | 0.502           | 5.00            | mg/kg | 200   |               | 103  | 80-120      |     |           | B     |
| Arsenic                     | 203    | 0.280           | 5.00            | mg/kg | 200   |               | 102  | 80-120      |     |           |       |
| Iron                        | 209    | 0.361           | 5.00            | mg/kg | 200   |               | 104  | 80-120      |     |           |       |
| Manganese                   | 49.4   | 0.0111          | 0.100           | mg/kg | 50.0  |               | 98.8 | 80-120      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

### Wet Chemistry - Quality Control

#### Batch BFJ0087 - EPA 300.0 11.7

Instrument: DX500 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit                                   | Units   | Spike Level                                       | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes   |
|---|--------|---|---------|---|---------------|------|-------------|-------|-----------|---------|
| <b>Blank (BFJ0087-BLK1)</b>   |        | Prepared: 04-Oct-2017 Analyzed: 04-Oct-2017 17:38 |         |   |               |      |             |       |           |         |
| Orthophosphorus   | ND     | 1.00  | mg-P/kg |   |               |      |             |       |           | U       |
| Sulfate   | 1.01   | 1.00  | mg/kg   |   |               |      |             |       |           | *       |
| <b>LCS (BFJ0087-BS1)</b>  |        | Prepared: 04-Oct-2017 Analyzed: 04-Oct-2017 17:55 |         |   |               |      |             |       |           |         |
| Orthophosphorus   | 101    | 5.00  | mg-P/kg | 100   |               | 101  | 75-125      |       |           | D       |
| Sulfate   | 99.0   | 5.00  | mg/kg   | 100   |               | 99.0 | 75-125      |       |           | D, B    |
| <b>Duplicate (BFJ0087-DUP2)</b>   |        | <b>Source: 17J0037-01RE1</b>                      |         | Prepared: 04-Oct-2017 Analyzed: 05-Oct-2017 09:38 |               |      |             |       |           |         |
| Orthophosphorus   | ND     | 2.23  | mg-P/kg |   | ND            |      |             |       |           | U       |
| <b>Duplicate (BFJ0087-DUP3)</b>   |        | <b>Source: 17J0037-01RE2</b>                      |         | Prepared: 04-Oct-2017 Analyzed: 05-Oct-2017 16:55 |               |      |             |       |           |         |
| Sulfate   | 335    | 11.1  | mg/kg   |   | 450           |      |             | 29.20 | 20        | *, D, B |
| <b>Matrix Spike (BFJ0087-MS1)</b>   |        | <b>Source: 17J0037-01RE1</b>                      |         | Prepared: 04-Oct-2017 Analyzed: 04-Oct-2017 18:45 |               |      |             |       |           |         |
| Orthophosphorus   | 98.0   | 5.53  | mg-P/kg | 111   | ND            | 88.6 | 75-125      |       |           | D       |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |         |   |               |      |             |       |           |         |
| <b>Matrix Spike (BFJ0087-MS2)</b>   |        | <b>Source: 17J0037-01RE2</b>                      |         | Prepared: 04-Oct-2017 Analyzed: 05-Oct-2017 17:12 |               |      |             |       |           |         |
| Sulfate   | 476    | 11.1  | mg/kg   | 111   | 450           | 23.2 | 75-125      |       |           | *, B, D |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |         |   |               |      |             |       |           |         |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**Wet Chemistry - Quality Control**

**Batch BFJ0169 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte               | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|-------|-------------|--|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0169-BLK1)</b>     |        |                 |       |             | Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 08:19                    |      |             |      |           |       |
| Total Solids, Sulfide           | ND     | 0.040           | %     |             |  |      |             |      |           | U     |
| <b>Duplicate (BFJ0169-DUP1)</b> |        |                 |       |             | Source: 17J0037-01 Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 08:19 |      |             |      |           |       |
| Total Solids, Sulfide           | 83.0   | 0.040           | %     |             | 82.2   |      |             | 1.02 | 20        |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

Wet Chemistry - Quality Control

Batch BFJ0211 - PSEP 1986 (modified)

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|-----------------------------------|--------|---|-------|---|---------------|------|-------------|------|-----------|-------|
| <b>Blank (BFJ0211-BLK1)</b>       |        | Prepared: 09-Oct-2017 Analyzed: 19-Oct-2017 10:07 |       |   |               |      |             |      |           |       |
| Total Carbon                      | ND     | 0.02  | %     |   |               |      |             |      |           | U     |
| Total Solids                      | ND     | 0.04  | %     |   |               |      |             |      |           | U     |
| <b>Duplicate (BFJ0211-DUP1)</b>   |        | <b>Source: 17J0037-01RE1</b>                      |       | Prepared: 09-Oct-2017 Analyzed: 19-Oct-2017 10:38 |               |      |             |      |           |       |
| Total Carbon                      | 0.13   | 0.02  | %     |   | 0.13          |      |             | 1.11 | 20        |       |
| Total Solids                      | 83.71  | 0.04  | %     |   | 83.73         |      |             | 0.03 | 20        |       |
| <b>Duplicate (BFJ0211-DUP2)</b>   |        | <b>Source: 17J0037-01RE1</b>                      |       | Prepared: 09-Oct-2017 Analyzed: 19-Oct-2017 11:17 |               |      |             |      |           |       |
| Total Carbon                      | 0.13   | 0.02  | %     |   | 0.13          |      |             | 6.72 | 20        |       |
| Total Solids                      | 84.64  | 0.04  | %     |   | 83.73         |      |             | 1.09 | 20        |       |
| <b>Matrix Spike (BFJ0211-MS2)</b> |        | <b>Source: 17J0037-01RE1</b>                      |       | Prepared: 09-Oct-2017 Analyzed: 19-Oct-2017 12:20 |               |      |             |      |           |       |
| Total Carbon                      | 1.05   | 0.02  | %     | 0.830   | 0.13          | 111  | 75-125      |      |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

|                                 |      |   |   |      |  |      |        |  |  |  |
|---------------------------------|------|---|---|------|--|------|--------|--|--|--|
| <b>Reference (BFJ0211-SRM2)</b> |      | Prepared: 09-Oct-2017 Analyzed: 19-Oct-2017 10:17 |   |      |  |      |        |  |  |  |
| Total Carbon                    | 3.19 | 0.02  | % | 3.35 |  | 95.3 | 80-120 |  |  |  |

Instrument: APOLLO2 Analyst: RLM

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units | Spike Level                                       | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|-----------------------------------|--------|---|-------|---|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0211-BLK2)</b>       |        | Prepared: 09-Oct-2017 Analyzed: 20-Oct-2017 11:24 |       |   |               |      |             |       |           |       |
| Total Organic Carbon              | ND     | 0.02  | %     |   |               |      |             |       |           | U     |
| <b>Duplicate (BFJ0211-DUP3)</b>   |        | <b>Source: 17J0037-01</b>                         |       | Prepared: 09-Oct-2017 Analyzed: 20-Oct-2017 11:55 |               |      |             |       |           |       |
| Total Organic Carbon              | 0.10   | 0.02  | %     |   | 0.08          |      |             | 29.30 | 20        | *     |
| <b>Duplicate (BFJ0211-DUP4)</b>   |        | <b>Source: 17J0037-01</b>                         |       | Prepared: 09-Oct-2017 Analyzed: 20-Oct-2017 12:06 |               |      |             |       |           |       |
| Total Organic Carbon              | 0.12   | 0.02  | %     |   | 0.08          |      |             | 43.90 | 20        | *     |
| <b>Matrix Spike (BFJ0211-MS3)</b> |        | <b>Source: 17J0037-01</b>                         |       | Prepared: 09-Oct-2017 Analyzed: 20-Oct-2017 12:11 |               |      |             |       |           |       |
| Total Organic Carbon              | 0.90   | 0.02  | %     | 0.830   | 0.08          | 99.4 | 75-125      |       |           |       |
| <b>Reference (BFJ0211-SRM1)</b>   |        | Prepared: 09-Oct-2017 Analyzed: 20-Oct-2017 11:35 |       |   |               |      |             |       |           |       |
| Total Organic Carbon              | 2.79   | 0.02  | %     | 2.45  |               | 114  | 75-125      |       |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**Wet Chemistry - Quality Control**

**Batch BFJ0211 - PSEP 1986 (modified)**

Instrument: APOLLO2 Analyst: RLM

| QC Sample/Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
|-------------------|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|

**Reference (BFJ0211-SRM1)**

Prepared: 09-Oct-2017 Analyzed: 20-Oct-2017 11:35





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**Wet Chemistry - Quality Control**

**Batch BFJ0257 - PSEP 1986**

Instrument: UV1800-2 Analyst: GM

| QC Sample/Analyte                 | Result | Reporting Limit           | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD    | RPD Limit | Notes |
|-----------------------------------|--------|---------------------------|-------|-------------|---|------|-------------|--------|-----------|-------|
| <b>Blank (BFJ0257-BLK1)</b>       |        |                           |       |             |   |      |             |        |           |       |
|                                   |        |                           |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 17:58 |      |             |        |           |       |
| Sulfide                           | ND     | 1.00                      | mg/kg |             |   |      |             |        |           | U     |
| <b>LCS (BFJ0257-BS1)</b>          |        |                           |       |             |   |      |             |        |           |       |
|                                   |        |                           |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 17:59 |      |             |        |           |       |
| Sulfide                           | 144    | 10.0                      | mg/kg | 165         |   | 87.3 | 75-125      |        |           | D     |
| <b>Duplicate (BFJ0257-DUP1)</b>   |        |                           |       |             |   |      |             |        |           |       |
|                                   |        | <b>Source: 17J0037-01</b> |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 18:00 |      |             |        |           |       |
| Sulfide                           | 12.3   | 1.14                      | mg/kg |             | 3.61  |      |             | 110.00 | 20        | *     |
| <b>Matrix Spike (BFJ0257-MS1)</b> |        |                           |       |             |   |      |             |        |           |       |
|                                   |        | <b>Source: 17J0037-01</b> |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 18:01 |      |             |        |           |       |
| Sulfide                           | 138    | 11.7                      | mg/kg | 193         | 3.61  | 71.4 | 75-125      |        |           | *, D  |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

**Wet Chemistry - Quality Control**

**Batch BFJ0293 - EPA 9045D**

Instrument: Accumet AR60 Analyst: A

| QC Sample/Analyte               | Result | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD  | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|-------------|--|------|-------------|------|-----------|-------|
| <b>LCS (BFJ0293-BS1)</b>        |        |                 |          |             | Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 14:07                    |      |             |      |           |       |
| pH                              | 6.99   | 0.01            | pH Units | 7.00        |  | 99.9 | 0-200       |      |           |       |
| <b>Duplicate (BFJ0293-DUP1)</b> |        |                 |          |             | Source: 17J0037-01 Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 14:07 |      |             |      |           |       |
| pH                              | 7.56   | 0.01            | pH Units |             | 7.57   |      |             | 0.13 | 20        |       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
20-Oct-2017 18:01

**Certified Analyses included in this Report**

| Analyte                         | Certifications             |
|---------------------------------|----------------------------|
| <b>EPA 300.0 in Solid</b>       |                            |
| Orthophosphorus                 | DoD-ELAP,WA-DW,WADOE,NELAP |
| Sulfate                         | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 6010C in Solid</b>       |                            |
| Aluminum                        | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | NELAP,WADOE,DoD-ELAP,ADEC  |
| Iron                            | NELAP,WADOE,DoD-ELAP       |
| Manganese                       | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 9045D in Solid</b>       |                            |
| pH                              | WADOE,CALAP,DoD-ELAP,NELAP |
| <b>EPA 9060A m in Solid</b>     |                            |
| Total Organic Carbon            | WADOE                      |
| <b>SM 4500-S2 D-00 in Solid</b> |                            |
| Sulfide                         | DoD-ELAP,NELAP,WADOE       |

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
20-Oct-2017 18:01

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- E The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.



13 November 2017

Troy Bussey Jr.  
Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia, WA 98503

RE: Port of Tacoma Arkema- FS Data Gap Investigation

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)

17J0062

Associated SDG ID(s)

N/A

----

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclosed Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, Inc.

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.*



# Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 17500602 Turn-around Requested: Normal

ARI Client Company: Pioneer Technologies Phone: 360-570-1700

Client Contact: Troy Bussey

Client Project Name: Former Arkema Manufacturing Site

Client Project #: DG Cooper 206-660-3466

Analytical Resources, Incorporated  
Analytical Chemists and Consultants  
4611 South 134th Place, Suite 100  
Tukwila, WA 98168  
206-695-6200 206-695-6201 (fax)



Date: \_\_\_\_\_ of \_\_\_\_\_

No. of Coolers: \_\_\_\_\_

Cooler Temps: \_\_\_\_\_

Analysis Requested

| Total Arsenic<br>EPA 3050B/6010C | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Si | EPA 1311/6010C/7470A | pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 3050/6010C | Sulfate, Ortho-phosphorus<br>EPA 300.0 | TOC, TIC<br>EPA 9060A Mod | Sulfide<br>SM 4500-S2(PESP) |
|----------------------------------|--|----------------------|----------------|------------------------------|--|---------------------------|-----------------------------|
|----------------------------------|--|----------------------|----------------|------------------------------|--|---------------------------|-----------------------------|

| Sample ID                                    | Date   | Time   | Matrix          | No. Containers              | Analysis Requested               |  |                      |                |                              |  |                           |                             | Notes/Comments |  |
|--|--|--|-----------------|-----------------------------|----------------------------------|--|----------------------|----------------|------------------------------|--|---------------------------|-----------------------------|----------------|--|
|  |  |  |                 |                             | Total Arsenic<br>EPA 3050B/6010C | TCLP Metals<br>As, Ba, Cd, Cr, Pb,<br>Hg, Se, Si | EPA 1311/6010C/7470A | pH<br>EPA 9045 | Fe, Al, Mn<br>EPA 3050/6010C | Sulfate, Ortho-phosphorus<br>EPA 300.0 | TOC, TIC<br>EPA 9060A Mod | Sulfide<br>SM 4500-S2(PESP) |                |  |
| <del>SD-10175-50-501-SED-100417-0-0-33</del> | <del>10/17</del>                                   | <del>1330</del>                                | <del>SOIL</del> | <del>1-16oz<br/>1-2oz</del> | X                                |  |                      | X              | X                            | X                                      | X                         | X                           |                |  |
| SD-10175-50-501-SED-100417-0-0-33            | 10/17  | 1430   | SOIL            | 1                           | X                                |  |                      | X              | X                            | X                                      | X                         | X                           |                |  |
| SD-10175-50-501-SED-100417-0-0-33            | 10/17  | 1530   | SOIL            | 1                           | X                                |  |                      | X              | X                            | X                                      | X                         | X                           |                |  |
| SD-10175-50-501-SED-100417-0-0-33            | 10/17  | 1535   | SOIL            | 1                           | X                                |  |                      | X              | X                            | X                                      | X                         | X                           |                |  |
| EB-EB-2-100417                               | 10/17  | 1545   | WATER           | 4                           | X                                |  |                      | X              | X                            | X                                      | X                         | X                           |                |  |
|  |  |  |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
|  |  |  |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
|  |  |  |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
|  |  |  |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
|  |  |  |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
|  |  |  |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
|  |  |  |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
| Comments/Special Instructions                | Relinquished by:<br>(Signature) <i>[Signature]</i> | Received by:<br>(Signature) <i>[Signature]</i> |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
| Sulfides preserved w/ZnAc                    | Printed Name: <u>Luke Kerker</u>                   | Printed Name: <u>Shelly L Fisher</u>           |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
|  | Company: <u>RF</u>                                 | Company: <u>ARI</u>                            |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |
|  | Date & Time: <u>10/17 1700</u>                     | Date & Time: <u>10/17 1700</u>                 |                 |                             |                                  |  |                      |                |                              |  |                           |                             |                |  |

**Limits of Liability:** ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

**Sample Retention Policy:** Unless specified by work order or contract, all water/soil samples submitted to ARI will be discarded or returned, no sooner than 90 days after submission of hardcopy data, whichever is longer. Sediment samples submitted under PSDDA/PSEP/SMS protocol will be stored frozen for up to one year and then discarded.





# Cooler Receipt Form

ARI Client: PIONEER

Project Name: Former Arkema

COC No(s): \_\_\_\_\_ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: \_\_\_\_\_

Assigned ARI Job No: 17J0062

Tracking No: \_\_\_\_\_ (NA)

**Preliminary Examination Phase:**

Were intact, properly signed and dated custody seals attached to the outside of to cooler? YES  NO

Were custody papers included with the cooler? ..... YES  NO

Were custody papers properly filled out (ink, signed, etc.) ..... YES  NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry) 7.4

Time: 1700

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: D002565

Cooler Accepted by: SLF Date: 10/4/17 Time: 1700

*Complete custody forms and attach all shipping documents*

**Log-In Phase:**

Was a temperature blank included in the cooler? ..... YES  NO

What kind of packing material was used? ... Bubble Wrap  Wet Ice  Gel Packs  Baggies  Foam Block  Paper  Other: \_\_\_\_\_

Was sufficient ice used (if appropriate)? ..... NA  YES  NO

Were all bottles sealed in individual plastic bags? ..... YES  NO

Did all bottles arrive in good condition (unbroken)? ..... YES  NO

Were all bottle labels complete and legible? ..... YES  NO

Did the number of containers listed on COC match with the number of containers received? ..... YES  NO

Did all bottle labels and tags agree with custody papers? ..... YES  NO

Were all bottles used correct for the requested analyses? ..... YES  NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs)... NA  YES  NO

Were all VOC vials free of air bubbles? ..... NA  YES  NO

Was sufficient amount of sample sent in each bottle? ..... NA  YES  NO

Date VOC Trip Blank was made at ARI ..... NA

Was Sample Split by ARI :  NA YES Date/Time: \_\_\_\_\_ Equipment: \_\_\_\_\_ Split by: \_\_\_\_\_

Samples Logged by: B.H. Date: 10/5/17 Time: 6:34

**\*\* Notify Project Manager of discrepancies or concerns \*\***

| Sample ID on Bottle | Sample ID on COC | Sample ID on Bottle | Sample ID on COC |
|---------------------|------------------|---------------------|------------------|
|                     |                  |                     |                  |
|                     |                  |                     |                  |
|                     |                  |                     |                  |

**Additional Notes, Discrepancies, & Resolutions:**

Two labels on 16oz jars had illegible sample IDs. Samples identified by writing on lid. One label of 5D-128 + 50-STI-SED-100417-0-0-33-(01) missing sampling date and time.

By: B.H. Date: 10/5/17

|  |  |  |                                 |
|--|--|--|---------------------------------|
|  |  |  | Small → "sm" (< 2 mm)           |
|  |  |  | Peabubbles → "pb" (2 to < 4 mm) |
|  |  |  | Large → "lg" (4 to < 6 mm)      |
|  |  |  | Headspace → "hs" (> 6 mm)       |



# Cooler Temperature Compliance Form

1750062

| Cooler#: <u>  1  </u>        |              | Temperature(°C): <u>7.4</u> |  |
|------------------------------|--------------|-----------------------------|--|
| Sample ID                    | Bottle Count | Bottle Type                 |  |
| Samples received<br>above 6° |              |                             |  |
|                              |              |                             |  |
|                              |              |                             |  |
|                              |              |                             |  |
|                              |              |                             |  |
|                              |              |                             |  |
|                              |              |                             |  |

| Cooler#: <u>        </u> |              | Temperature(°C): <u>        </u> |  |
|--------------------------|--------------|----------------------------------|--|
| Sample ID                | Bottle Count | Bottle Type                      |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |

| Cooler#: <u>        </u> |              | Temperature(°C): <u>        </u> |  |
|--------------------------|--------------|----------------------------------|--|
| Sample ID                | Bottle Count | Bottle Type                      |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |

| Cooler#: <u>        </u> |              | Temperature(°C): <u>        </u> |  |
|--------------------------|--------------|----------------------------------|--|
| Sample ID                | Bottle Count | Bottle Type                      |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |
|                          |              |                                  |  |

Completed by: SF Date: 10/4/17 Time: 1700





WORK ORDER

17J0062

|  |                                    |
|--|------------------------------------|
| Client: Pioneer Technologies Corporation                 | Project Manager: Amanda Volgardsen |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio | Project Number: [none]             |

| Analysis  | Due               | TAT | Expires           | Comments |
|---|-------------------|-----|-------------------|----------|
| <b>17J0062-05 EB-EB-2-100417 [Water] Sampled 04-Oct-2017 15:45 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   |          |
| Phosphorus, Ortho-P, IC, EPA 300.0  | 19-Oct-2017 15:00 | 10  | 06-Oct-2017 15:45 |          |
| Sulfide, SM 4500-S2 D-0, Water  | 19-Oct-2017 15:00 | 10  | 11-Oct-2017 15:45 |          |
| Sulfate, IC, EPA 300.0  | 19-Oct-2017 15:00 | 10  | 01-Nov-2017 15:45 |          |
| Met 6010C - Fe  | 19-Oct-2017 15:00 | 10  | 02-Apr-2018 15:45 |          |
| Met 6010C - As  | 19-Oct-2017 15:00 | 10  | 02-Apr-2018 15:45 |          |
| Met 6010C - Al  | 19-Oct-2017 15:00 | 10  | 02-Apr-2018 15:45 |          |
| Inorganic Carbon, Total (TIC)   | 19-Oct-2017 15:00 | 10  | 01-Nov-2017 15:45 |          |
| Met 6010C - Mn  | 19-Oct-2017 15:00 | 10  | 02-Apr-2018 15:45 |          |
| Organic Carbon, Total, 9060A  | 19-Oct-2017 15:00 | 10  | 01-Nov-2017 15:45 |          |
| pH, EPA 9040C   | 19-Oct-2017 15:00 | 10  | 04-Oct-2017 15:59 |          |

Analysis groups included in this work order

Inorganic Carbon, Total (calc)

Solids, Total, Dried at 70 °C    Solids, Total, Dried at 103 °C    Organic Carbon, Total, 906    Carbon, Total (TC) 9060m

Preservation Confirmation

| Container ID | Container Type                    | pH      |
|--------------|-----------------------------------|---------|
| 17J0062-01 A | Glass WM, Clear, 2 oz, ZnOAc      |         |
| 17J0062-01 B | Glass WM, Clear, 16 oz            |         |
| 17J0062-02 A | Glass WM, Clear, 2 oz, ZnOAc      |         |
| 17J0062-02 B | Glass WM, Clear, 16 oz            |         |
| 17J0062-03 A | Glass WM, Clear, 2 oz, ZnOAc      |         |
| 17J0062-03 B | Glass WM, Clear, 16 oz            |         |
| 17J0062-04 A | Glass WM, Clear, 2 oz, ZnOAc      |         |
| 17J0062-04 B | Glass WM, Clear, 16 oz            |         |
| 17J0062-05 A | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass |
| 17J0062-05 B | Small OJ, 500 mL                  |         |
| 17J0062-05 C | Small OJ, 500 mL, ZnOAc           | L2 Fail |
| 17J0062-05 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass |

B.H.  
Preservation Confirmed By

10/5/17  
Date

B.H.  
Reviewed By

10/5/17  
Date



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID                            | Laboratory ID | Matrix | Date Sampled      | Date Received     |
|--------------------------------------|---------------|--------|-------------------|-------------------|
| SD-120+75-ST1-SED-100417-0-0.33      | 17J0062-01    | Solid  | 04-Oct-2017 13:30 | 04-Oct-2017 17:00 |
| SD-125+00-ST1-SED-100417-0-0.33      | 17J0062-02    | Solid  | 04-Oct-2017 14:30 | 04-Oct-2017 17:00 |
| SD-128+50-ST1-SED-100417-0-0.33      | 17J0062-03    | Solid  | 04-Oct-2017 15:30 | 04-Oct-2017 17:00 |
| SD-128+50-ST1-SED-100417-0-0.33-(01) | 17J0062-04    | Solid  | 04-Oct-2017 15:35 | 04-Oct-2017 17:00 |
| EB-EB-2-100417                       | 17J0062-05    | Water  | 04-Oct-2017 15:45 | 04-Oct-2017 17:00 |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

## Case Narrative

### Sample receipt

Samples as listed on the preceding page were received October 4, 2017 under ARI workorder 17J0062. For details regarding sample receipt, please refer to the Cooler Receipt Form.

### Total Metals - EPA Method 6010C

The samples were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank BFJ0222 has Aluminum detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. The method blank also has Iron detected below the reporting limit, but above the method detection limit. The Iron has been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

Method blank BFJ0167 has Aluminum and Iron detected below the reporting limits, but above the method detection limits. These metals have been flagged with a "J" qualifier on the method blank. No further corrective action was taken.

The LCS percent recoveries were within control limits.

### Anions - EPA Method 300.0

The samples were prepared and analyzed within the recommended holding times.

The method blank BFJ0129 has Sulfate detected above the reporting limit. Associated detected results and QC have been flagged with a "B" qualifier. No further corrective action was taken.

The LCS percent recoveries were within control limits.

A matrix spike and duplicate BFJ0129 were prepared in conjunction with the re-analysis of sample SD-128+50-STI-SED-100417-0-0.33-(01). The matrix spike has low spike recovery for O-phos and a natural concentration of Sulfate that is so much greater than the concentration spike that an accurate determination of spike recovery is not possible. The Sulfate has been flagged with an "HC" qualifier on the matrix spike. This is likely due to matrix interference. The duplicate has high RPD for Sulfate. The results are advisory. No further corrective action was taken.

### Total Organic Carbon/Total Carbon - EPA Method 9060A

The samples were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

There were no target compounds detected in the method blank.

The SRM percent recoveries were within control limits.



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

The LCS percent recoveries were within control limits.

A matrix spike and duplicate were prepared in conjunction with the re-analysis of sample EB-EB-2-100417. The matrix spike percent recoveries and duplicate RPD were within QC limits.

#### **Sulfide - Method SM4500**

The samples were prepared and analyzed within the recommended holding times.

There were no target compounds detected in the method blank.

The LCS percent recoveries were within control limits.

#### **pH - EPA Method 9045**

Sample EB-EB-2-100417 was received outside of the fifteen minute recommended holding time, and has been flagged with an "H" qualifier.

The LCS percent recoveries were within control limits.

A duplicate was prepared in conjunction with sample EB-EB-2-100417. The duplicate RPD was within QC limits.



WORK ORDER

17J0062

|  |                                    |
|--|------------------------------------|
| Client: Pioneer Technologies Corporation                 | Project Manager: Amanda Volgardsen |
| Project: Port of Tacoma Arkema- FS Data Gap Investigatio | Project Number: [none]             |

| Analysis  | Due               | TAT | Expires           | Comments |
|---|-------------------|-----|-------------------|----------|
| <b>17J0062-05 EB-EB-2-100417 [Water] Sampled 04-Oct-2017 15:45 (GMT-08:00) Pacific Time (US &amp; Canada)</b> |                   |     |                   |          |
| Phosphorus, Ortho-P, IC, EPA 300.0  | 19-Oct-2017 15:00 | 10  | 06-Oct-2017 15:45 |          |
| Sulfide, SM 4500-S2 D-0, Water  | 19-Oct-2017 15:00 | 10  | 11-Oct-2017 15:45 |          |
| Sulfate, IC, EPA 300.0  | 19-Oct-2017 15:00 | 10  | 01-Nov-2017 15:45 |          |
| Met 6010C - Fe  | 19-Oct-2017 15:00 | 10  | 02-Apr-2018 15:45 |          |
| Met 6010C - As  | 19-Oct-2017 15:00 | 10  | 02-Apr-2018 15:45 |          |
| Met 6010C - Al  | 19-Oct-2017 15:00 | 10  | 02-Apr-2018 15:45 |          |
| Inorganic Carbon, Total (TIC)   | 19-Oct-2017 15:00 | 10  | 01-Nov-2017 15:45 |          |
| Met 6010C - Mn  | 19-Oct-2017 15:00 | 10  | 02-Apr-2018 15:45 |          |
| Organic Carbon, Total, 9060A  | 19-Oct-2017 15:00 | 10  | 01-Nov-2017 15:45 |          |
| pH, EPA 9040C   | 19-Oct-2017 15:00 | 10  | 04-Oct-2017 15:59 |          |

Analysis groups included in this work order

Inorganic Carbon, Total (calc)

Solids, Total, Dried at 70 %    Solids, Total, Dried at 103    Organic Carbon, Total, 906    Carbon, Total (TC) 9060m

**Preservation Confirmation**

| Container ID | Container Type                    | pH                           |
|--------------|-----------------------------------|------------------------------|
| 17J0062-01 A | Glass WM, Clear, 2 oz, ZnOAc      |                              |
| 17J0062-01 B | Glass WM, Clear, 16 oz            |                              |
| 17J0062-02 A | Glass WM, Clear, 2 oz, ZnOAc      |                              |
| 17J0062-02 B | Glass WM, Clear, 16 oz            |                              |
| 17J0062-03 A | Glass WM, Clear, 2 oz, ZnOAc      |                              |
| 17J0062-03 B | Glass WM, Clear, 16 oz            |                              |
| 17J0062-04 A | Glass WM, Clear, 2 oz, ZnOAc      |                              |
| 17J0062-04 B | Glass WM, Clear, 16 oz            |                              |
| 17J0062-05 A | Glass NM, Amber, 250 mL, 9N H2SO4 | L2 Pass                      |
| 17J0062-05 B | Small OJ, 500 mL                  |                              |
| 17J0062-05 C | Small OJ, 500 mL, ZnOAc           | L2 Fail Pass 712 AGW 10/5/17 |
| 17J0062-05 D | HDPE NM, 500 mL, 1:1 HNO3         | L2 Pass                      |

B.H.  
Preservation Confirmed By

10/5/17  
Date

B.H.  
Reviewed By

10/5/17  
Date





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**SD-120+75-ST1-SED-100417-0-0.33**  
**17J0062-01 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/04/2017 13:30  
Analyzed: 12-Oct-2017 19:02

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.064 g (wet) Dry Weight: 0.87 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 82.07

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.575           | 5.73            | <b>10700</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.321           | 5.73            | <b>9.79</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.413           | 5.73            | <b>22000</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0127          | 0.115           | <b>154</b>   | mg/kg |       |



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Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-120+75-ST1-SED-100417-0-0.33**  
**17J0062-01 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 13:30  
Analyzed: 05-Oct-2017 14:24

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0129 Sample Size: 4.45 g (wet) Dry Weight: 3.65 g  
Prepared: 05-Oct-2017 Final Volume: 40 mL % Solids: 82.07

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 2.19            | <b>2.44</b> | mg-P/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-120+75-ST1-SED-100417-0-0.33**  
**17J0062-01 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 10/04/2017 13:30

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 14:07

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFJ0293

Prepared: 11-Oct-2017

Sample Size: 22.1 g (wet)

Final Volume: 20 mL

Dry Weight: 18.14 g

% Solids: 82.07

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.009           | 7.76   | pH Units |       |





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Olympia WA, 98503

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Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**SD-120+75-ST1-SED-100417-0-0.33**  
**17J0062-01 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/04/2017 13:30  
Analyzed: 20-Oct-2017 13:43

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 82.07

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.308</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 13:42

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.82 g  
% Solids: 82.07

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.49</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 13:43

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.82 g  
% Solids: 82.07

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.18</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-120+75-ST1-SED-100417-0-0.33**  
**17J0062-01 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/04/2017 13:30  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 4.10 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 82.07

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>79.9</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-120+75-ST1-SED-100417-0-0.33**  
**17J0062-01 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/04/2017 13:30  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.82 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 82.07

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>82.07</b> | %     |       |



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Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-120+75-ST1-SED-100417-0-0.33**  
**17J0062-01 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/04/2017 13:30  
Analyzed: 10-Oct-2017 18:04

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.112 g (wet) Dry Weight: 4.20 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 82.07

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfide | 18496-25-8 | 10       | 11.9            | <b>178</b> | mg/kg | D     |



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Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-120+75-ST1-SED-100417-0-0.33**  
**17J0062-01RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 13:30  
Analyzed: 06-Oct-2017 18:10

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0129 Sample Size: 4.45 g (wet) Dry Weight: 3.65 g  
Prepared: 05-Oct-2017 Final Volume: 40 mL % Solids: 82.07

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 21.9            | <b>624</b> | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**SD-125+00-ST1-SED-100417-0-0.33**  
**17J0062-02 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/04/2017 14:30  
Analyzed: 12-Oct-2017 19:05

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.037 g (wet) Dry Weight: 0.91 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 87.84

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.551           | 5.49            | <b>9170</b>  | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.308           | 5.49            | <b>5.64</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.396           | 5.49            | <b>16700</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0122          | 0.110           | <b>160</b>   | mg/kg |       |



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Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-125+00-ST1-SED-100417-0-0.33**  
**17J0062-02 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 14:30  
Analyzed: 05-Oct-2017 14:41

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0129 Sample Size: 4.67 g (wet) Dry Weight: 4.10 g  
Prepared: 05-Oct-2017 Final Volume: 40 mL % Solids: 87.84

| Analyte         | CAS Number | Dilution | Reporting Limit | Result      | Units   | Notes |
|-----------------|------------|----------|-----------------|-------------|---------|-------|
| Orthophosphorus | 1426-54-42 | 2        | 1.95            | <b>2.38</b> | mg-P/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-125+00-ST1-SED-100417-0-0.33**  
**17J0062-02 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 10/04/2017 14:30

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 14:07

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFJ0293

Prepared: 11-Oct-2017

Sample Size: 20.26 g (wet)

Final Volume: 20 mL

Dry Weight: 17.80 g

% Solids: 87.84

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 7.68   | pH Units |       |





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Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**SD-125+00-ST1-SED-100417-0-0.33**  
**17J0062-02 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/04/2017 14:30  
Analyzed: 20-Oct-2017 13:48

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 87.84

| Analyte          | CAS Number | Dilution | Reporting Limit | Result        | Units | Notes |
|------------------|------------|----------|-----------------|---------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.0498</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 13:56

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.88 g  
% Solids: 87.84

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.18</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 13:48

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.88 g  
% Solids: 87.84

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.13</b> | %     |       |



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Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-125+00-ST1-SED-100417-0-0.33**  
**17J0062-02 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/04/2017 14:30  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 4.39 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 87.84

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>86.5</b> | %     |       |



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Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-125+00-ST1-SED-100417-0-0.33**  
**17J0062-02 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/04/2017 14:30  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.88 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 87.84

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>87.84</b> | %     |       |



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Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-125+00-ST1-SED-100417-0-0.33**  
**17J0062-02 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/04/2017 14:30  
Analyzed: 10-Oct-2017 18:20

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.485 g (wet) Dry Weight: 4.82 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 87.84

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.04            | <b>5.98</b> | mg/kg |       |



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Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-125+00-ST1-SED-100417-0-0.33**  
**17J0062-02RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 14:30  
Analyzed: 06-Oct-2017 18:27

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0129 Sample Size: 4.67 g (wet) Dry Weight: 4.10 g  
Prepared: 05-Oct-2017 Final Volume: 40 mL % Solids: 87.84

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 10       | 9.75            | 275    | mg/kg | D     |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33**  
**17J0062-03 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/04/2017 15:30  
Analyzed: 12-Oct-2017 19:09

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.048 g (wet) Dry Weight: 0.67 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 64.35

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.745           | 7.41            | <b>11200</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.415           | 7.41            | <b>10.9</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.535           | 7.41            | <b>16100</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0164          | 0.148           | <b>125</b>   | mg/kg |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33**  
**17J0062-03 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 15:30  
Analyzed: 05-Oct-2017 14:57

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0129 Sample Size: 4.54 g (wet) Dry Weight: 2.92 g  
Prepared: 05-Oct-2017 Final Volume: 40 mL % Solids: 64.35

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 6.85            | ND     | mg-P/kg | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33**  
**17J0062-03 (Solid)**

**Wet Chemistry**

Method: EPA 9045D

Sampled: 10/04/2017 15:30

Instrument: Accumet AR60

Analyzed: 11-Oct-2017 14:07

Sample Preparation:

Preparation Method: EPA 9045D

Preparation Batch: BFJ0293

Prepared: 11-Oct-2017

Sample Size: 20.92 g (wet)

Final Volume: 20 mL

Dry Weight: 13.46 g

% Solids: 64.35

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.01            | 7.39   | pH Units |       |





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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33**  
**17J0062-03 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/04/2017 15:30  
Analyzed: 20-Oct-2017 13:57

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 64.35

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.402</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 14:06

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.64 g  
% Solids: 64.35

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.96</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 13:57

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.64 g  
% Solids: 64.35

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.55</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33**  
**17J0062-03 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/04/2017 15:30  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 3.22 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 64.35

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>69.9</b> | %     |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33**  
**17J0062-03 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/04/2017 15:30  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.64 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 64.35

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>64.35</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33**  
**17J0062-03 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/04/2017 15:30  
Analyzed: 10-Oct-2017 18:20

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.558 g (wet) Dry Weight: 3.58 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 64.35

| Analyte | CAS Number | Dilution | Reporting Limit | Result     | Units | Notes |
|---------|------------|----------|-----------------|------------|-------|-------|
| Sulfide | 18496-25-8 | 10       | 14.0            | <b>230</b> | mg/kg | D     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33**  
**17J0062-03RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 15:30  
Analyzed: 06-Oct-2017 18:44

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0129 Sample Size: 4.54 g (wet) Dry Weight: 2.92 g  
Prepared: 05-Oct-2017 Final Volume: 40 mL % Solids: 64.35

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 20       | 27.4            | <b>1130</b> | mg/kg | D     |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33-(01)**  
**17J0062-04 (Solid)**

**Metals and Metallic Compounds**

Method: EPA 6010C  
Instrument: ICP2

Sampled: 10/04/2017 15:35  
Analyzed: 12-Oct-2017 19:14

Sample Preparation: Preparation Method: SWC EPA 3050B  
Preparation Batch: BFJ0222 Sample Size: 1.049 g (wet) Dry Weight: 0.70 g  
Prepared: 10-Oct-2017 Final Volume: 50 mL % Solids: 66.81

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result       | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|--------------|-------|-------|
| Aluminum  | 7429-90-5  | 2        | 0.717           | 7.13            | <b>11200</b> | mg/kg | B     |
| Arsenic   | 7440-38-2  | 2        | 0.400           | 7.13            | <b>9.90</b>  | mg/kg |       |
| Iron      | 7439-89-6  | 2        | 0.515           | 7.13            | <b>16600</b> | mg/kg |       |
| Manganese | 7439-96-5  | 2        | 0.0158          | 0.143           | <b>124</b>   | mg/kg |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33-(01)**  
**17J0062-04 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 15:35  
Analyzed: 05-Oct-2017 15:14

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0129 Sample Size: 4.11 g (wet) Dry Weight: 2.75 g  
Prepared: 05-Oct-2017 Final Volume: 40 mL % Solids: 66.81

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units   | Notes |
|-----------------|------------|----------|-----------------|--------|---------|-------|
| Orthophosphorus | 1426-54-42 | 5        | 7.28            | ND     | mg-P/kg | U     |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33-(01)**  
**17J0062-04 (Solid)**

**Wet Chemistry**

Method: EPA 9045D  
Instrument: Accumet AR60

Sampled: 10/04/2017 15:35  
Analyzed: 11-Oct-2017 14:07

Sample Preparation: Preparation Method: EPA 9045D  
Preparation Batch: BFJ0293 Sample Size: 21.08 g (wet) Dry Weight: 14.08 g  
Prepared: 11-Oct-2017 Final Volume: 20 mL % Solids: 66.81

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units    | Notes |
|---------|------------|----------|-----------------|--------|----------|-------|
| pH      |            | 1        | 0.009           | 7.65   | pH Units |       |





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5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33-(01)**  
**17J0062-04 (Solid)**

**Wet Chemistry**

Method: EPA 9060A m  
Instrument: [CALC]

Sampled: 10/04/2017 15:35  
Analyzed: 20-Oct-2017 14:05

Sample Preparation: Preparation Method: [CALC]  
Preparation Batch: [CALC]  
Prepared: 09-Oct-2017 Final Volume: 1 % Solids: 66.81

| Analyte          | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|------------------|------------|----------|-----------------|--------------|-------|-------|
| Inorganic Carbon |            | 1        | 0.0400          | <b>0.172</b> | %     |       |

Instrument: APOLLO1

Analyzed: 19-Oct-2017 14:15

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.67 g  
% Solids: 66.81

| Analyte      | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|--------------|------------|----------|-----------------|-------------|-------|-------|
| Total Carbon |            | 1        | 0.02            | <b>0.62</b> | %     |       |

Instrument: APOLLO2

Analyzed: 20-Oct-2017 14:05

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211  
Prepared: 09-Oct-2017 Sample Size: 1 g (wet)  
Final Volume: 1 mL Dry Weight: 0.67 g  
% Solids: 66.81

| Analyte              | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Organic Carbon |            | 1        | 0.02            | <b>0.44</b> | %     |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33-(01)**  
**17J0062-04 (Solid)**

**Wet Chemistry**

Method: PSEP 1986  
Instrument: N/A

Sampled: 10/04/2017 15:35  
Analyzed: 06-Oct-2017 08:19

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0169 Sample Size: 5 g (wet) Dry Weight: 3.34 g  
Prepared: 06-Oct-2017 Final Volume: 5 g % Solids: 66.81

| Analyte               | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|-----------------------|------------|----------|-----------------|-------------|-------|-------|
| Total Solids, Sulfide |            | 1        | 0.040           | <b>60.1</b> | %     |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33-(01)**  
**17J0062-04 (Solid)**

**Wet Chemistry**

Method: SM 2540 G-97  
Instrument: N/A

Sampled: 10/04/2017 15:35  
Analyzed: 09-Oct-2017 12:12

Sample Preparation: Preparation Method: PSEP 1986 (modified)  
Preparation Batch: BFJ0211 Sample Size: 1 g (wet) Dry Weight: 0.67 g  
Prepared: 09-Oct-2017 Final Volume: 1 mL % Solids: 66.81

| Analyte      | CAS Number | Dilution | Reporting Limit | Result       | Units | Notes |
|--------------|------------|----------|-----------------|--------------|-------|-------|
| Total Solids |            | 1        | 0.04            | <b>66.81</b> | %     |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33-(01)**  
**17J0062-04 (Solid)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/04/2017 15:35  
Analyzed: 10-Oct-2017 18:21

Sample Preparation: Preparation Method: PSEP 1986  
Preparation Batch: BFJ0257 Sample Size: 5.145 g (wet) Dry Weight: 3.44 g  
Prepared: 10-Oct-2017 Final Volume: 100 mL % Solids: 66.81

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 1.45            | <b>28.4</b> | mg/kg |       |



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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**SD-128+50-ST1-SED-100417-0-0.33-(01)**  
**17J0062-04RE1 (Solid)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 15:35  
Analyzed: 06-Oct-2017 19:01

Sample Preparation: Preparation Method: EPA 300.0 11.7  
Preparation Batch: BFJ0129 Sample Size: 4.11 g (wet) Dry Weight: 2.75 g  
Prepared: 05-Oct-2017 Final Volume: 40 mL % Solids: 66.81

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units | Notes |
|---------|------------|----------|-----------------|-------------|-------|-------|
| Sulfate | 14808-79-8 | 50       | 72.8            | <b>1310</b> | mg/kg | D     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**EB-EB-2-100417**

**17J0062-05 (Water)**

**Metals and Metallic Compounds**

Method: EPA 6010C

Sampled: 10/04/2017 15:45

Instrument: ICP2

Analyzed: 12-Oct-2017 19:41

Sample Preparation:

Preparation Method: TWC EPA 3010A

Preparation Batch: BFJ0167

Prepared: 06-Oct-2017

Sample Size: 25 mL

Final Volume: 25 mL

| Analyte   | CAS Number | Dilution | Detection Limit | Reporting Limit | Result        | Units | Notes |
|-----------|------------|----------|-----------------|-----------------|---------------|-------|-------|
| Aluminum  | 7429-90-5  | 1        | 0.0085          | 0.0500          | ND            | mg/L  | U     |
| Arsenic   | 7440-38-2  | 1        | 0.0047          | 0.0500          | ND            | mg/L  | U     |
| Iron      | 7439-89-6  | 1        | 0.0013          | 0.0500          | <b>0.0094</b> | mg/L  | J     |
| Manganese | 7439-96-5  | 1        | 0.0003          | 0.0010          | <b>0.0005</b> | mg/L  | J     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**EB-EB-2-100417**

**17J0062-05 (Water)**

**Wet Chemistry**

Method: EPA 300.0  
Instrument: DX500

Sampled: 10/04/2017 15:45  
Analyzed: 05-Oct-2017 12:43

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0131 Sample Size: 5 mL  
Prepared: 05-Oct-2017 Final Volume: 5 mL

| Analyte         | CAS Number | Dilution | Reporting Limit | Result | Units  | Notes |
|-----------------|------------|----------|-----------------|--------|--------|-------|
| Orthophosphorus | 1426-54-42 | 1        | 0.10            | ND     | mg-P/L | U     |

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfate | 14808-79-8 | 1        | 0.100           | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**EB-EB-2-100417**

**17J0062-05 (Water)**

**Wet Chemistry**

Method: EPA 9040C

Sampled: 10/04/2017 15:45

Instrument: Accumet AR60

Analyzed: 05-Oct-2017 09:55

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0139  
Prepared: 05-Oct-2017

Sample Size: 50 mL  
Final Volume: 50 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result      | Units    | Notes |
|---------|------------|----------|-----------------|-------------|----------|-------|
| pH      |            | 1        | 0.01            | <b>6.82</b> | pH Units | H     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**EB-EB-2-100417**  
**17J0062-05 (Water)**

**Wet Chemistry**

Method: EPA 9060A  
Instrument: TOC-LCSH

Sampled: 10/04/2017 15:45  
Analyzed: 07-Oct-2017 01:07

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0180 Sample Size: 20 mL  
Prepared: 06-Oct-2017 Final Volume: 20 mL

| Analyte              | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|----------------------|------------|----------|-----------------|--------|-------|-------|
| Total Organic Carbon |            | 1        | 0.50            | ND     | mg/L  | U     |

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0181 Sample Size: 20 mL  
Prepared: 06-Oct-2017 Final Volume: 20 mL

| Analyte                | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|------------------------|------------|----------|-----------------|--------|-------|-------|
| Total Inorganic Carbon |            | 1        | 0.50            | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**EB-EB-2-100417**  
**17J0062-05 (Water)**

**Wet Chemistry**

Method: SM 4500-S2 D-00  
Instrument: UV1800-2

Sampled: 10/04/2017 15:45  
Analyzed: 09-Oct-2017 14:33

Sample Preparation: Preparation Method: No Prep Wet Chem  
Preparation Batch: BFJ0233 Sample Size: 5 mL  
Prepared: 09-Oct-2017 Final Volume: 5 mL

| Analyte | CAS Number | Dilution | Reporting Limit | Result | Units | Notes |
|---------|------------|----------|-----------------|--------|-------|-------|
| Sulfide | 18496-25-8 | 1        | 0.050           | ND     | mg/L  | U     |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0167 - TWC EPA 3010A**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0167-BLK1)</b> |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 06-Oct-2017 Analyzed: 12-Oct-2017 15:49 |      |             |     |           |       |
| Aluminum                    | 0.0181 | 0.0085          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Arsenic                     | ND     | 0.0047          | 0.0500          | mg/L  |             |   |      |             |     |           | U     |
| Iron                        | 0.0110 | 0.0013          | 0.0500          | mg/L  |             |   |      |             |     |           | J     |
| Manganese                   | ND     | 0.0003          | 0.0010          | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0167-BS1)</b>    |        |                 |                 |       |             |   |      |             |     |           |       |
|                             |        |                 |                 |       |             | Prepared: 06-Oct-2017 Analyzed: 12-Oct-2017 16:05 |      |             |     |           |       |
| Aluminum                    | 2.07   | 0.0085          | 0.0500          | mg/L  | 2.00        |   | 103  | 80-120      |     |           |       |
| Arsenic                     | 2.22   | 0.0047          | 0.0500          | mg/L  | 2.00        |   | 111  | 80-120      |     |           |       |
| Iron                        | 2.13   | 0.0013          | 0.0500          | mg/L  | 2.00        |   | 106  | 80-120      |     |           |       |
| Manganese                   | 0.507  | 0.0003          | 0.0010          | mg/L  | 0.500       |   | 101  | 80-120      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**Metals and Metallic Compounds - Quality Control**

**Batch BFJ0222 - SWC EPA 3050B**

Instrument: ICP2 Analyst: CC

| QC Sample/Analyte           | Result | Detection Limit | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0222-BLK1)</b> |        |                 |                 |       |             | Prepared: 10-Oct-2017 Analyzed: 11-Oct-2017 17:28 |      |             |     |           |       |
| Aluminum                    | 10.1   | 0.502           | 5.00            | mg/kg |             |   |      |             |     |           |       |
| Arsenic                     | ND     | 0.280           | 5.00            | mg/kg |             |   |      |             |     |           | U     |
| Iron                        | 0.438  | 0.361           | 5.00            | mg/kg |             |   |      |             |     |           | J     |
| Manganese                   | ND     | 0.0111          | 0.100           | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0222-BS1)</b>    |        |                 |                 |       |             | Prepared: 10-Oct-2017 Analyzed: 11-Oct-2017 17:43 |      |             |     |           |       |
| Aluminum                    | 206    | 0.502           | 5.00            | mg/kg | 200         |   | 103  | 80-120      |     |           | B     |
| Arsenic                     | 203    | 0.280           | 5.00            | mg/kg | 200         |   | 102  | 80-120      |     |           |       |
| Iron                        | 209    | 0.361           | 5.00            | mg/kg | 200         |   | 104  | 80-120      |     |           |       |
| Manganese                   | 49.4   | 0.0111          | 0.100           | mg/kg | 50.0        |   | 98.8 | 80-120      |     |           |       |



Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

### Wet Chemistry - Quality Control

#### Batch BFJ0129 - EPA 300.0 11.7

Instrument: DX500 Analyst: KK

| QC Sample/Analyte   | Result | Reporting Limit                                   | Units   | Spike Level                                       | Source Result | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---|--------|---|---------|---|---------------|------|-------------|-------|-----------|-------|
| <b>Blank (BFJ0129-BLK1)</b>   |        | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 13:50 |         |   |               |      |             |       |           |       |
| Orthophosphorus   | ND     | 1.00  | mg-P/kg |   |               |      |             |       |           | U     |
| Sulfate   | ND     | 1.00  | mg/kg   |   |               |      |             |       |           | U     |
| <b>LCS (BFJ0129-BS1)</b>  |        | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 14:07 |         |   |               |      |             |       |           |       |
| Orthophosphorus   | 95.5   | 5.00  | mg-P/kg | 100   |               | 95.5 | 75-125      |       |           | D     |
| Sulfate   | 93.4   | 5.00  | mg/kg   | 100   |               | 93.4 | 75-125      |       |           | D     |
| <b>Duplicate (BFJ0129-DUP1)</b>   |        | <b>Source: 17J0062-04</b>                         |         | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 16:04 |               |      |             |       |           |       |
| Orthophosphorus   | ND     | 6.76  | mg-P/kg |   | ND            |      |             |       |           | U     |
| <b>Duplicate (BFJ0129-DUP2)</b>   |        | <b>Source: 17J0062-04RE1</b>                      |         | Prepared: 05-Oct-2017 Analyzed: 06-Oct-2017 19:17 |               |      |             |       |           |       |
| Sulfate   | 869    | 67.6  | mg/kg   |   | 1310          |      |             | 40.10 | 20        | *, D  |
| <b>Matrix Spike (BFJ0129-MS1)</b>   |        | <b>Source: 17J0062-04</b>                         |         | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 16:21 |               |      |             |       |           |       |
| Orthophosphorus   | 96.3   | 7.28  | mg-P/kg | 146   | ND            | 66.1 | 75-125      |       |           | *, D  |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |         |   |               |      |             |       |           |       |
| <b>Matrix Spike (BFJ0129-MS3)</b>   |        | <b>Source: 17J0062-04RE1</b>                      |         | Prepared: 05-Oct-2017 Analyzed: 06-Oct-2017 19:34 |               |      |             |       |           |       |
| Sulfate   | 1300   | 72.8  | mg/kg   | 146   | 1310          | NR   | 75-125      |       |           | HC, D |
| Recovery limits for target analytes in MS/MSD QC samples are advisory only. |        |   |         |   |               |      |             |       |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

Wet Chemistry - Quality Control

Batch BFJ0131 - No Prep Wet Chem

Instrument: DX500 Analyst: KK

| QC Sample/Analyte                 | Result | Reporting Limit                                   | Units  | Spike Level                                       | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|---|--------|---|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0131-BLK1)</b>       |        | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 11:36 |        |   |               |      |             |     |           |       |
| Orthophosphorus                   | ND     | 0.10  | mg-P/L |   |               |      |             |     |           | U     |
| Sulfate                           | ND     | 0.100   | mg/L   |   |               |      |             |     |           | U     |
| <b>LCS (BFJ0131-BS1)</b>          |        | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 11:53 |        |   |               |      |             |     |           |       |
| Orthophosphorus                   | 1.50   | 0.10  | mg-P/L | 1.50  |               | 100  | 75-125      |     |           |       |
| Sulfate                           | 1.52   | 0.100   | mg/L   | 1.50  |               | 101  | 75-125      |     |           |       |
| <b>Duplicate (BFJ0131-DUP1)</b>   |        | <b>Source: 17J0062-05</b>                         |        | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 13:00 |               |      |             |     |           |       |
| Orthophosphorus                   | ND     | 0.10  | mg-P/L |   | ND            |      |             |     |           | U     |
| Sulfate                           | ND     | 0.100   | mg/L   |   | ND            |      |             |     |           | U     |
| <b>Matrix Spike (BFJ0131-MS1)</b> |        | <b>Source: 17J0062-05</b>                         |        | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 13:17 |               |      |             |     |           |       |
| Orthophosphorus                   | 2.10   | 0.10  | mg-P/L | 2.00  | ND            | 105  | 75-125      |     |           |       |
| Sulfate                           | 2.04   | 0.100   | mg/L   | 2.00  | ND            | 102  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**Wet Chemistry - Quality Control**

**Batch BFJ0139 - No Prep Wet Chem**

Instrument: Accumet AR60 Analyst: F

| QC Sample/Analyte               | Result | Reporting Limit | Units    | Spike Level | Source Result  | %REC | %REC Limits | RPD   | RPD Limit | Notes |
|---------------------------------|--------|-----------------|----------|-------------|--|------|-------------|-------|-----------|-------|
| <b>LCS (BFJ0139-BS1)</b>        |        |                 |          |             | Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 09:55                    |      |             |       |           |       |
| pH                              | 7.00   | 0.01            | pH Units | 7.00        |  | 100  | 0-200       |       |           |       |
| <b>Duplicate (BFJ0139-DUP1)</b> |        |                 |          |             | Source: 17J0062-05 Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 09:55 |      |             |       |           |       |
| pH                              | 6.37   | 0.01            | pH Units |             | 6.82   |      |             | 6.82  | 20        | H     |
| <b>Duplicate (BFJ0139-DUP2)</b> |        |                 |          |             | Source: 17J0062-05 Prepared: 05-Oct-2017 Analyzed: 05-Oct-2017 09:55 |      |             |       |           |       |
| pH                              | 5.98   | 0.01            | pH Units |             | 6.82   |      |             | 13.10 | 20        | H     |



|  |   |                                       |
|--|---|---------------------------------------|
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|--|---|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFJ0169 - No Prep Wet Chem**

Instrument: N/A

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0169-BLK1)</b> |        |                 |       |             | Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 08:19 |      |             |     |           |       |
| Total Solids, Sulfide       | ND     | 0.040           | %     |             |   |      |             |     |           | U     |





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Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**Wet Chemistry - Quality Control**

**Batch BFJ0180 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0180-BLK1)</b> |        |                 |       |             | Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 19:22 |      |             |     |           |       |
| Total Organic Carbon        | ND     | 0.50            | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0180-BS1)</b>    |        |                 |       |             | Prepared: 06-Oct-2017 Analyzed: 06-Oct-2017 19:40 |      |             |     |           |       |
| Total Organic Carbon        | 19.8   | 0.50            | mg/L  | 20.0        |   | 98.8 | 90-110      |     |           |       |



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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

**Wet Chemistry - Quality Control**

**Batch BFJ0181 - No Prep Wet Chem**

Instrument: TOC-LCSH Analyst: CDE

| QC Sample/Analyte                 | Result | Reporting Limit | Units | Spike Level | Source Result  | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------------|--------|-----------------|-------|-------------|--|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0181-BLK1)</b>       |        |                 |       |             | Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 12:56                    |      |             |     |           |       |
| Total Inorganic Carbon            | ND     | 0.50            | mg/L  |             |  |      |             |     |           | U     |
| <b>LCS (BFJ0181-BS1)</b>          |        |                 |       |             | Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 13:10                    |      |             |     |           |       |
| Total Inorganic Carbon            | 19.2   | 0.50            | mg/L  | 20.0        |  | 96.0 | 90-110      |     |           |       |
| <b>Duplicate (BFJ0181-DUP1)</b>   |        |                 |       |             | Source: 17J0062-05 Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 13:44 |      |             |     |           |       |
| Total Inorganic Carbon            | ND     | 0.50            | mg/L  |             | ND   |      |             |     |           | U     |
| <b>Matrix Spike (BFJ0181-MS1)</b> |        |                 |       |             | Source: 17J0062-05 Prepared: 06-Oct-2017 Analyzed: 07-Oct-2017 13:58 |      |             |     |           |       |
| Total Inorganic Carbon            | 20.1   | 0.50            | mg/L  | 20.0        | ND   | 100  | 75-125      |     |           |       |

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**Wet Chemistry - Quality Control**

**Batch BFJ0211 - PSEP 1986 (modified)**

Instrument: APOLLO1 Analyst: KLE

| QC Sample/Analyte                                 | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0211-BLK1)</b>                       |        |                 |       |             |               |      |             |     |           |       |
| Prepared: 09-Oct-2017 Analyzed: 19-Oct-2017 10:07 |        |                 |       |             |               |      |             |     |           |       |
| Total Carbon                                      | ND     | 0.02            | %     |             |               |      |             |     |           | U     |
| Total Solids                                      | ND     | 0.04            | %     |             |               |      |             |     |           | U     |

**Reference (BFJ0211-SRM2)**

Prepared: 09-Oct-2017 Analyzed: 19-Oct-2017 10:17

|              |      |      |   |      |  |      |        |  |  |  |
|--------------|------|------|---|------|--|------|--------|--|--|--|
| Total Carbon | 3.19 | 0.02 | % | 3.35 |  | 95.3 | 80-120 |  |  |  |
|--------------|------|------|---|------|--|------|--------|--|--|--|

Instrument: APOLLO2 Analyst: RLM

| QC Sample/Analyte                                 | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Notes |
|---|--------|-----------------|-------|-------------|---------------|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0211-BLK2)</b>                       |        |                 |       |             |               |      |             |     |           |       |
| Prepared: 09-Oct-2017 Analyzed: 20-Oct-2017 11:24 |        |                 |       |             |               |      |             |     |           |       |
| Total Organic Carbon                              | ND     | 0.02            | %     |             |               |      |             |     |           | U     |
| <b>Reference (BFJ0211-SRM1)</b>                   |        |                 |       |             |               |      |             |     |           |       |
| Prepared: 09-Oct-2017 Analyzed: 20-Oct-2017 11:35 |        |                 |       |             |               |      |             |     |           |       |
| Total Organic Carbon                              | 2.79   | 0.02            | %     | 2.45        |               | 114  | 75-125      |     |           |       |



|  |   |                                       |
|--|---|---------------------------------------|
| Pioneer Technologies Corporation<br>5205 Corporate Ctr. Ct. SE, Ste A<br>Olympia WA, 98503 | Project: Port of Tacoma Arkema- FS Data Gap Investigation<br>Project Number: [none]<br>Project Manager: Troy Bussey Jr. | <b>Reported:</b><br>13-Nov-2017 12:19 |
|--|---|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFJ0233 - No Prep Wet Chem**

Instrument: UV1800-2 Analyst: GM

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0233-BLK1)</b> |        |                 |       |             | Prepared: 09-Oct-2017 Analyzed: 09-Oct-2017 14:12 |      |             |     |           |       |
| Sulfide                     | ND     | 0.050           | mg/L  |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0233-BS1)</b>    |        |                 |       |             | Prepared: 09-Oct-2017 Analyzed: 09-Oct-2017 14:13 |      |             |     |           |       |
| Sulfide                     | 0.449  | 0.050           | mg/L  | 0.498       |   | 90.1 | 75-125      |     |           |       |



|  |   |                                       |
|--|---|---------------------------------------|
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|--|---|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFJ0257 - PSEP 1986**

Instrument: UV1800-2 Analyst: GM

| QC Sample/Analyte           | Result | Reporting Limit | Units | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|-----------------------------|--------|-----------------|-------|-------------|---|------|-------------|-----|-----------|-------|
| <b>Blank (BFJ0257-BLK1)</b> |        |                 |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 17:58 |      |             |     |           |       |
| Sulfide                     | ND     | 1.00            | mg/kg |             |   |      |             |     |           | U     |
| <b>LCS (BFJ0257-BS1)</b>    |        |                 |       |             | Prepared: 10-Oct-2017 Analyzed: 10-Oct-2017 17:59 |      |             |     |           |       |
| Sulfide                     | 144    | 10.0            | mg/kg | 165         |   | 87.3 | 75-125      |     |           | D     |



|  |   |                                       |
|--|---|---------------------------------------|
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|--|---|---------------------------------------|

**Wet Chemistry - Quality Control**

**Batch BFJ0293 - EPA 9045D**

Instrument: Accumet AR60 Analyst: A

| QC Sample/Analyte        | Result | Reporting Limit | Units    | Spike Level | Source Result                                     | %REC | %REC Limits | RPD | RPD Limit | Notes |
|--------------------------|--------|-----------------|----------|-------------|---|------|-------------|-----|-----------|-------|
| <b>LCS (BFJ0293-BS1)</b> |        |                 |          |             | Prepared: 11-Oct-2017 Analyzed: 11-Oct-2017 14:07 |      |             |     |           |       |
| pH                       | 6.99   | 0.01            | pH Units | 7.00        |   | 99.9 | 0-200       |     |           |       |



Pioneer Technologies Corporation  
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Project: Port of Tacoma Arkema- FS Data Gap Investigation  
Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

**Certified Analyses included in this Report**

| Analyte                         | Certifications             |
|---------------------------------|----------------------------|
| <b>EPA 300.0 in Solid</b>       |                            |
| Orthophosphorus                 | DoD-ELAP,WA-DW,WADOE,NELAP |
| Sulfate                         | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 300.0 in Water</b>       |                            |
| Orthophosphorus                 | DoD-ELAP,WADOE,WA-DW,NELAP |
| Sulfate                         | DoD-ELAP,WADOE,WA-DW,NELAP |
| <b>EPA 6010C in Solid</b>       |                            |
| Aluminum                        | NELAP,WADOE,DoD-ELAP       |
| Arsenic                         | NELAP,WADOE,DoD-ELAP,ADEC  |
| Iron                            | NELAP,WADOE,DoD-ELAP       |
| Manganese                       | NELAP,WADOE,DoD-ELAP       |
| <b>EPA 6010C in Water</b>       |                            |
| Aluminum                        | WADOE,NELAP,DoD-ELAP       |
| Arsenic                         | WADOE,NELAP,ADEC,DoD-ELAP  |
| Iron                            | WADOE,NELAP,DoD-ELAP       |
| Manganese                       | WADOE,NELAP,DoD-ELAP       |
| <b>EPA 9040C in Water</b>       |                            |
| pH                              | CALAP,WADOE,NELAP          |
| <b>EPA 9045D in Solid</b>       |                            |
| pH                              | WADOE,CALAP,DoD-ELAP,NELAP |
| <b>EPA 9060A in Water</b>       |                            |
| Total Organic Carbon            | DoD-ELAP,WADOE,NELAP       |
| <b>EPA 9060A m in Solid</b>     |                            |
| Total Organic Carbon            | WADOE                      |
| <b>SM 4500-S2 D-00 in Solid</b> |                            |
| Sulfide                         | DoD-ELAP,NELAP,WADOE       |
| <b>SM 4500-S2 D-00 in Water</b> |                            |
| Sulfide                         | DoD-ELAP,WADOE,NELAP       |



Pioneer Technologies Corporation  
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Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

**Reported:**  
13-Nov-2017 12:19

| Code     | Description  | Number   | Expires    |
|----------|--|----------|------------|
| ADEC     | Alaska Dept of Environmental Conservation          | UST-033  | 09/01/2017 |
| CALAP    | California Department of Public Health CAELAP      | 2748     | 02/28/2018 |
| DoD-ELAP | DoD-Environmental Laboratory Accreditation Program | 66169    | 02/07/2019 |
| NELAP    | ORELAP - Oregon Laboratory Accreditation Program   | WA100006 | 05/11/2018 |
| WADOE    | WA Dept of Ecology                                 | C558     | 06/30/2018 |
| WA-DW    | Ecology - Drinking Water                           | C558     | 06/30/2018 |





Pioneer Technologies Corporation  
5205 Corporate Ctr. Ct. SE, Ste A  
Olympia WA, 98503

Project: Port of Tacoma Arkema- FS Data Gap Investigation

Project Number: [none]  
Project Manager: Troy Bussey Jr.

Reported:  
13-Nov-2017 12:19

### Notes and Definitions

- U This analyte is not detected above the applicable reporting or detection limit.
- J Estimated concentration value detected below the reporting limit.
- HC The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
- H Hold time violation - Hold time was exceeded.
- D The reported value is from a dilution
- B This analyte was detected in the method blank.
- \* Flagged value is not within established control limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference
- [2C] Indicates this result was quantified on the second column on a dual column analysis.

**Data Gap #2D**  
**2017 Sequential Extraction (BAL)**



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

February 19, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On September 13<sup>th</sup> through September 21<sup>st</sup>, 2017, Brooks Applied Labs (BAL) received fourteen (14) soil/sediment samples. A five-step selective sequential extraction (SSE) method, based on *Wenzel et al.*, was employed for correlation between metals (aluminum [Al], arsenic [As], iron [Fe], manganese [Mn], and silicon [Si]) and different substrate properties. Other analyses were requested (i.e. total recoverable arsenic). This report describes the Wenzel SSE results for the soil/sediment samples only. Results for total recoverable arsenic are included in a separate report.

All samples were stored and prepped anoxically in an oxygen free glove box. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

Shortly after receipt, all submitted core samples were unpacked in a glove box maintained under anoxic conditions, split into appropriate sample containers, and then stored according to BAL SOPs. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

### **Total Solids Analysis**

#### **Batch B180177**

A known mass of each soil sample was placed into a pre-weighed pan, then the combined mass of the sample and pan was recorded. All samples were placed into a convection oven maintained at a temperature of 105°C. After drying for a minimum of forty-eight (48) hours, all samples were briefly cooled and reweighed. The total solids percentage of each sample was calculated by dividing the weight of the dried sample by the weight of the original sample.

### **Al, As, Fe, Mn, and Si (Five Step SSE (Wenzel et al.)) Quantitation by ICP-QQQ-MS**

Metals quantitation ([Al], [As], [Fe], [Mn], and [Si]) was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Prior to the analyses, a sequential extraction method, based on *Wenzel et al.*, was employed. The applied extraction solutions are designed to target the different substrate components. The following table provides details on the various fractions in the Five Step SSE (*Wenzel et al.*). At the request of the client, step one Five Step SSE (*Wenzel et al.*) of the extraction is not used in for this project. Consequently, the table begins with step two of the SSE.

**Five Step SSE (Wenzel et al.)**

| SSE Extraction Step | Analyte Code | Extraction Liquid Identity  | Volume Extraction Liquid (mL) | Target Fraction/Substrate Description |
|---------------------|--------------|---|-------------------------------|---------------------------------------|
| 2                   | xx(WEN2)     | 0.05 M (NH <sub>4</sub> ) H <sub>2</sub> PO <sub>4</sub>                | 25                            | Specifically-sorbed metals            |
| 3                   | xx(WEN3)     | 0.2M ammonium oxalate buffer (pH=3.25)                                  | 25                            | Amorphous metal oxyhydroxides         |
| 4                   | xx(WEN4)     | 0.2M ammonium oxalate buffer + 0.1M Ascorbic Acid                       | 25                            | Crystalline metal oxyhydroxides       |
| 5                   | xx(WEN5)     | concentrated HNO <sub>3</sub> , H <sub>2</sub> O <sub>2</sub> , and HCl | 50                            | Residual, Total Recoverable           |
| 6                   | xx(WEN6)     | concentrated HNO <sub>3</sub> , HCl, and HF                             | 50                            | Residual, Total digest                |

Approximately 1g of each soil sample was transferred to a 50mL polypropylene vial and exactly 25mL of 0.05 M NH<sub>4</sub>H<sub>2</sub>PO<sub>4</sub> was added to each vial. Each vial was capped and shaken on an inverting shaker for 16 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN2", the WEN2 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 20mL of reagent water was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

All sample vials were wrapped in aluminum foil to prevent photo-oxidation and exactly 25mL of 0.2M ammonium oxalate buffer (pH=3.25) was added to each vial. Each vial was capped and shaken on an inverting shaker for 4 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN3", the WEN3 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 12.5mL of ammonium oxalate buffer was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

Exactly 25mL of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were then placed in a hotblock digestion apparatus at 96°C for 30 minutes.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN4", the WEN4 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 12.5mL of 0.2M ammonium oxalate buffer with 0.1M

ascorbic acid was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

The residual solid pellets remaining in the vials were then digested with aliquots of concentrated HNO<sub>3</sub>, HCl, and H<sub>2</sub>O<sub>2</sub> (in accordance with a modified EPA Method 3050B). The samples were removed from the hot block apparatus and allowed to cool. The samples were centrifuged for 20 minutes at 3000RPM. Afterward, the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN5".

The residual solid pellets remaining in the vials were then digested in a closed vessel (bomb) with concentrated nitric, hydrochloric, and hydrofluoric acids, in accordance with a modified EPA Method 3052. The resulting digests were labeled "WEN6".

All samples were stored and prepped anoxically in an oxygen free glove box. Degassed reagent water was used to prepare extraction solutions for each step, except for steps 5 and 6 (i.e. residual metals fractions). For each fraction requiring an inverting rotator, the tumbling step took place in an anoxic environment (glovebox).

Total recoverable metals quantitation on individual fractions was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

#### Batch B180106 (WEN2 analyses)

The relative percent difference (RPD) value for manganese in the laboratory duplicate sample, B180106-DUP2, was greater than the control limit of 30%, at 35%. Re-analysis confirmed the result. The manganese result for the source sample, 1803009-13, should be considered estimated due to poor precision, and has been qualified "M".

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to elevated MDLs, it was necessary to raise the MRL to 2 times the value of the MDL for arsenic results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The counts per second (CPS) value for iron in the third method blank sample, B180106-BLK1, was elevated, indicating a possible error in sampling by the autosampler. The iron value for this sample (0.574 mg/kg) was omitted from calculations used to determine the MDLs associated with iron results.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were ≤ 25% of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B180269 (WEN2 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to

account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B180107 (WEN3 analyses)

The RPD value for manganese in the laboratory duplicate sample, B180106-DUP2, was greater than the control limit of 30%, at 52%. Re-analysis confirmed the result. The manganese result for the source sample, 1803009-13, should be considered estimated due to poor precision, and has been qualified "M".

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to elevated MDLs, it was necessary to raise the MRL to 2 times the value of the MDL for iron, manganese, and silicon results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B180270 (WEN3 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to elevated MDLs, it was necessary to raise the MRL to 2 times the value of the MDL for arsenic results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B180108 (WEN4 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to elevated MDLs, it was necessary to raise the MRL to 2 times the value of the MDL for aluminum, arsenic, iron, manganese, and silicon results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B180109 (WEN5 analyses)

The blank spike sample (B180109-BS1) and the reference material sample (B180109-SRM2) were switched at analytical prep. Re-analyses of these samples confirmed. The QC samples B180109-BS1 and B180109-SRM2 were re-named to reflect the correct designations, yielding acceptable recoveries for all target analytes.

All client samples and associated QC samples were re-analyzed for confirmation. Re-analyses confirmed the results. Arsenic results are reported from this batch due to good agreement between analytical runs and lower MDL/MRLs in Batch B180109.

The RPD value for arsenic in the laboratory duplicate sample, B180109-DUP2, is greater than the control limit of 30%, at 33%. Re-analyses confirmed the results. The arsenic result for the source sample, 1803009-13, should be considered estimated due to poor precision, and has been qualified "M".

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to elevated MDLs, it was necessary to raise the MRL to 2 times the value of the MDL for arsenic results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B180272 (WEN5 analyses)

The arsenic spike recovery for the reference material sample, B180272-SRM2, is greater than the upper control limit of 125% (at 135%). However, the results meet secondary criteria (i.e. *results < 5 X the MRL*

and the difference between results  $< 2X$  the MRL). A blank spike sample (B180272-BS1) was also employed in the total metals digest. The B180272-BS1 recovery for total arsenic is acceptable at 110%, demonstrating that the applied digest stabilizes arsenic in solution. The total arsenic matrix spike and matrix spike duplicate (MS/MSD) recoveries are acceptable at 97% and 107%, respectively. Since the arsenic recoveries in the blank spike sample, the MS, and the MSD were acceptable, the reference material recoveries is deemed unrepresentative of digest performance. No corrective actions were required, and no qualification of data was necessary.

The blank spike sample (B180272-BS2) was not spiked with silicon; the silicon recovery for the blank spike sample is not included in this report. The reference material sample, B180272-SRM2, is certified for silicon and the silicon recovery in B180272-SRM2 is acceptable, at 92%.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to elevated MDLs, it was necessary to raise the MRL to 2 times the value of the MDL for aluminum, arsenic, and iron results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B180110 (WEN6 analyses)

The aluminum spike recovery for the reference material sample, B180110-SRM2, is less than the lower control limit of 75% (at 68%). Re-analyses confirmed the results. All aluminum results in Batch B180110 should be considered estimated and have been qualified "J-1" to indicate a potential low bias.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to elevated MDLs, it was necessary to raise the MRL to 2 times the value of the MDL for aluminum and iron results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).



#### Batch B180273 (WEN6 analyses)

A blank spike sample (B180273-BS1) and two reference material samples (B180273-SRM2 and B180273-SRM3) were used in the digest for batch B180273. All recoveries were within acceptable ranges, demonstrating that the applied digest stabilizes arsenic in solution.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to an elevated MDL, it was necessary to raise the MRL to 2 times the value of the MDL for arsenic results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B180230 (WEN6 analyses)

A blank spike sample (B180230-BS2) and two reference material samples (B180230-SRM3 and B180230-SRM6) were used in the digest for batch B180230. All recoveries were within acceptable ranges, demonstrating that the applied digest stabilizes silicon in solution.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to an elevated MDL, it was necessary to raise the MRL to 2 times the value of the MDL for silicon results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

With the exceptions noted above, all associated quality control sample results met the acceptance criteria. BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Result is estimated.   |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>J-M</b> | Duplicate precision (RPD) for associated QC sample was not within acceptance criteria. Result is estimated.                       |
| <b>J-N</b> | Spike recovery for associated QC sample was not within acceptance criteria. Result is estimated.                                  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Result is estimated.  |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Result is estimated.   |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| <b>Sample</b>               | <b>Lab ID</b> | <b>Report Matrix</b> | <b>Type</b> | <b>Sampled</b> | <b>Received</b> |
|-----------------------------|---------------|----------------------|-------------|----------------|-----------------|
| SO-PTC-208-091317-12.0-14.0 | 1803009-01    | Soil                 | Sample      | 09/13/2017     | 09/14/2017      |
| SO-PTC-208-091317-23.0-25.0 | 1803009-02    | Soil                 | Sample      | 09/13/2017     | 09/14/2017      |
| SO-PTC-101-091417-8.2-10.2  | 1803009-03    | Soil                 | Sample      | 09/14/2017     | 09/15/2017      |
| SO-PTC-101-091417-19.3-20.3 | 1803009-04    | Soil                 | Sample      | 09/14/2017     | 09/15/2017      |
| SO-PTC-121-091817-11.0-13.0 | 1803009-05    | Soil                 | Sample      | 09/18/2017     | 09/18/2017      |
| SO-PTC-121-091817-22.0-24.0 | 1803009-06    | Soil                 | Sample      | 09/18/2017     | 09/18/2017      |
| SO-PTC-111-091817-6.0-8.0   | 1803009-07    | Soil                 | Sample      | 09/18/2017     | 09/19/2017      |
| SO-PTC-111-091817-20.0-22.0 | 1803009-08    | Soil                 | Sample      | 09/18/2017     | 09/19/2017      |
| SO-PTC-204-091917-10.8-12.8 | 1803009-09    | Soil                 | Sample      | 09/19/2017     | 09/19/2017      |
| SO-PTC-204-091917-23.0-25.0 | 1803009-10    | Soil                 | Sample      | 09/19/2017     | 09/19/2017      |
| SO-PTC-113-092017-7.5-10.0  | 1803009-11    | Soil                 | Sample      | 09/20/2017     | 09/20/2017      |
| SO-PTC-113-092017-18.0-20.0 | 1803009-12    | Soil                 | Sample      | 09/20/2017     | 09/20/2017      |
| SO-PTC-129-092017-10.0-12.0 | 1803009-13    | Soil                 | Sample      | 09/20/2017     | 09/21/2017      |
| SO-PTC-129-092017-22.5-25.0 | 1803009-14    | Soil                 | Sample      | 09/20/2017     | 09/21/2017      |



## Batch Summary

| Analyte  | Lab Matrix    | Method   | Prepared   | Analyzed   | Batch   | Sequence |
|----------|---------------|----------|------------|------------|---------|----------|
| %TS      | Soil/Sediment | SM 2540G | 01/23/2018 | 01/25/2018 | B180177 | N/A      |
| Al(WEN2) | Soil/Sediment | In-House | 01/16/2018 | 02/07/2018 | B180269 | 1800172  |
| Al(WEN3) | Soil/Sediment | In-House | 01/16/2018 | 01/30/2018 | B180107 | 1800138  |
| Al(WEN4) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180108 | 1800138  |
| Al(WEN5) | Soil/Sediment | In-House | 01/16/2018 | 02/08/2018 | B180272 | 1800172  |
| Al(WEN6) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180110 | 1800138  |
| As(WEN2) | Soil/Sediment | In-House | 01/16/2018 | 01/30/2018 | B180106 | 1800138  |
| As(WEN2) | Soil/Sediment | In-House | 01/16/2018 | 02/07/2018 | B180106 | 1800172  |
| As(WEN3) | Soil/Sediment | In-House | 01/16/2018 | 02/07/2018 | B180270 | 1800172  |
| As(WEN4) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180108 | 1800138  |
| As(WEN5) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180109 | 1800138  |
| As(WEN5) | Soil/Sediment | In-House | 01/16/2018 | 02/08/2018 | B180272 | 1800172  |
| As(WEN6) | Soil/Sediment | In-House | 01/16/2018 | 02/08/2018 | B180273 | 1800172  |
| Fe(WEN2) | Soil/Sediment | In-House | 01/16/2018 | 01/30/2018 | B180106 | 1800138  |
| Fe(WEN3) | Soil/Sediment | In-House | 01/16/2018 | 01/30/2018 | B180107 | 1800138  |
| Fe(WEN4) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180108 | 1800138  |
| Fe(WEN5) | Soil/Sediment | In-House | 01/16/2018 | 02/08/2018 | B180272 | 1800172  |
| Fe(WEN6) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180110 | 1800138  |
| Mn(WEN2) | Soil/Sediment | In-House | 01/16/2018 | 01/30/2018 | B180106 | 1800138  |
| Mn(WEN3) | Soil/Sediment | In-House | 01/16/2018 | 01/30/2018 | B180107 | 1800138  |
| Mn(WEN4) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180108 | 1800138  |
| Mn(WEN5) | Soil/Sediment | In-House | 01/16/2018 | 02/08/2018 | B180272 | 1800172  |
| Mn(WEN6) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180110 | 1800138  |
| Si(WEN2) | Soil/Sediment | In-House | 01/16/2018 | 02/07/2018 | B180269 | 1800172  |
| Si(WEN3) | Soil/Sediment | In-House | 01/16/2018 | 01/30/2018 | B180107 | 1800138  |
| Si(WEN4) | Soil/Sediment | In-House | 01/16/2018 | 01/31/2018 | B180108 | 1800138  |
| Si(WEN5) | Soil/Sediment | In-House | 01/16/2018 | 02/08/2018 | B180272 | 1800172  |
| Si(WEN6) | Soil/Sediment | In-House | 01/23/2018 | 02/02/2018 | B180230 | 1800156  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-208-091317-12.0-14.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-01                         | %TS      | Soil          | NA    | 83.34  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-01                         | Al(WEN2) | Soil          | dry   | 4.84   |           | 0.088 | 0.294 | mg/kg | B180269 | 1800172  |
| 1803009-01                         | Al(WEN3) | Soil          | dry   | 688    |           | 0.147 | 0.294 | mg/kg | B180107 | 1800138  |
| 1803009-01                         | Al(WEN4) | Soil          | dry   | 300    |           | 0.191 | 0.382 | mg/kg | B180108 | 1800138  |
| 1803009-01                         | Al(WEN5) | Soil          | dry   | 7650   |           | 0.647 | 1.29  | mg/kg | B180272 | 1800172  |
| 1803009-01                         | Al(WEN6) | Soil          | dry   | 27400  | J-1       | 2.82  | 5.64  | mg/kg | B180110 | 1800138  |
| 1803009-01                         | As(WEN2) | Soil          | dry   | 0.522  |           | 0.015 | 0.029 | mg/kg | B180106 | 1800172  |
| 1803009-01                         | As(WEN3) | Soil          | dry   | 0.169  | J         | 0.129 | 0.259 | mg/kg | B180270 | 1800172  |
| 1803009-01                         | As(WEN4) | Soil          | dry   | ≤ 1.23 | U         | 1.23  | 2.47  | mg/kg | B180108 | 1800138  |
| 1803009-01                         | As(WEN5) | Soil          | dry   | 2.04   | J         | 1.70  | 3.41  | mg/kg | B180109 | 1800138  |
| 1803009-01                         | As(WEN6) | Soil          | dry   | ≤ 2.35 | U         | 2.35  | 4.70  | mg/kg | B180273 | 1800172  |
| 1803009-01                         | Fe(WEN2) | Soil          | dry   | 31.4   |           | 0.470 | 0.941 | mg/kg | B180106 | 1800138  |
| 1803009-01                         | Fe(WEN3) | Soil          | dry   | 1790   |           | 0.999 | 2.00  | mg/kg | B180107 | 1800138  |
| 1803009-01                         | Fe(WEN4) | Soil          | dry   | 1180   |           | 0.823 | 1.65  | mg/kg | B180108 | 1800138  |
| 1803009-01                         | Fe(WEN5) | Soil          | dry   | 11500  |           | 1.03  | 2.06  | mg/kg | B180272 | 1800172  |
| 1803009-01                         | Fe(WEN6) | Soil          | dry   | 24600  |           | 2.47  | 4.94  | mg/kg | B180110 | 1800138  |
| 1803009-01                         | Mn(WEN2) | Soil          | dry   | 1.80   |           | 0.010 | 0.029 | mg/kg | B180106 | 1800138  |
| 1803009-01                         | Mn(WEN3) | Soil          | dry   | 11.2   |           | 0.176 | 0.353 | mg/kg | B180107 | 1800138  |
| 1803009-01                         | Mn(WEN4) | Soil          | dry   | 5.09   |           | 0.153 | 0.323 | mg/kg | B180108 | 1800138  |
| 1803009-01                         | Mn(WEN5) | Soil          | dry   | 102    |           | 0.007 | 0.059 | mg/kg | B180272 | 1800172  |
| 1803009-01                         | Mn(WEN6) | Soil          | dry   | 514    |           | 0.081 | 0.470 | mg/kg | B180110 | 1800138  |
| 1803009-01                         | Si(WEN2) | Soil          | dry   | 338    |           | 0.441 | 2.94  | mg/kg | B180269 | 1800172  |
| 1803009-01                         | Si(WEN3) | Soil          | dry   | 181    |           | 1.53  | 3.23  | mg/kg | B180107 | 1800138  |
| 1803009-01                         | Si(WEN4) | Soil          | dry   | 207    |           | 2.06  | 4.11  | mg/kg | B180108 | 1800138  |
| 1803009-01                         | Si(WEN5) | Soil          | dry   | 204    |           | 0.882 | 5.88  | mg/kg | B180272 | 1800172  |
| 1803009-01                         | Si(WEN6) | Soil          | dry   | 272000 |           | 411   | 823   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-208-091317-23.0-25.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-02                         | %TS      | Soil          | NA    | 77.03  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-02                         | Al(WEN2) | Soil          | dry   | 15.1   |           | 0.094 | 0.312 | mg/kg | B180269 | 1800172  |
| 1803009-02                         | Al(WEN3) | Soil          | dry   | 292    |           | 0.156 | 0.312 | mg/kg | B180107 | 1800138  |
| 1803009-02                         | Al(WEN4) | Soil          | dry   | 375    |           | 0.203 | 0.406 | mg/kg | B180108 | 1800138  |
| 1803009-02                         | Al(WEN5) | Soil          | dry   | 6770   |           | 0.687 | 1.37  | mg/kg | B180272 | 1800172  |
| 1803009-02                         | Al(WEN6) | Soil          | dry   | 33500  | J-1       | 3.00  | 5.99  | mg/kg | B180110 | 1800138  |
| 1803009-02                         | As(WEN2) | Soil          | dry   | 0.999  |           | 0.016 | 0.031 | mg/kg | B180106 | 1800138  |
| 1803009-02                         | As(WEN3) | Soil          | dry   | 0.317  |           | 0.137 | 0.275 | mg/kg | B180270 | 1800172  |
| 1803009-02                         | As(WEN4) | Soil          | dry   | ≤ 1.31 | U         | 1.31  | 2.62  | mg/kg | B180108 | 1800138  |
| 1803009-02                         | As(WEN5) | Soil          | dry   | 2.99   | J         | 1.81  | 3.62  | mg/kg | B180109 | 1800138  |
| 1803009-02                         | As(WEN6) | Soil          | dry   | 2.90   | J         | 2.50  | 4.99  | mg/kg | B180273 | 1800172  |
| 1803009-02                         | Fe(WEN2) | Soil          | dry   | 4.40   |           | 0.499 | 0.999 | mg/kg | B180106 | 1800138  |
| 1803009-02                         | Fe(WEN3) | Soil          | dry   | 175    |           | 1.06  | 2.12  | mg/kg | B180107 | 1800138  |
| 1803009-02                         | Fe(WEN4) | Soil          | dry   | 844    |           | 0.874 | 1.75  | mg/kg | B180108 | 1800138  |
| 1803009-02                         | Fe(WEN5) | Soil          | dry   | 9900   |           | 1.09  | 2.18  | mg/kg | B180272 | 1800172  |
| 1803009-02                         | Fe(WEN6) | Soil          | dry   | 21900  |           | 2.62  | 5.24  | mg/kg | B180110 | 1800138  |
| 1803009-02                         | Mn(WEN2) | Soil          | dry   | 0.675  |           | 0.010 | 0.031 | mg/kg | B180106 | 1800138  |
| 1803009-02                         | Mn(WEN3) | Soil          | dry   | 3.39   |           | 0.187 | 0.374 | mg/kg | B180107 | 1800138  |
| 1803009-02                         | Mn(WEN4) | Soil          | dry   | 4.97   |           | 0.162 | 0.343 | mg/kg | B180108 | 1800138  |
| 1803009-02                         | Mn(WEN5) | Soil          | dry   | 64.2   |           | 0.008 | 0.062 | mg/kg | B180272 | 1800172  |
| 1803009-02                         | Mn(WEN6) | Soil          | dry   | 420    |           | 0.086 | 0.499 | mg/kg | B180110 | 1800138  |
| 1803009-02                         | Si(WEN2) | Soil          | dry   | 88.8   |           | 0.468 | 3.12  | mg/kg | B180269 | 1800172  |
| 1803009-02                         | Si(WEN3) | Soil          | dry   | 147    |           | 1.62  | 3.43  | mg/kg | B180107 | 1800138  |
| 1803009-02                         | Si(WEN4) | Soil          | dry   | 287    |           | 2.18  | 4.37  | mg/kg | B180108 | 1800138  |
| 1803009-02                         | Si(WEN5) | Soil          | dry   | 132    |           | 0.936 | 6.24  | mg/kg | B180272 | 1800172  |
| 1803009-02                         | Si(WEN6) | Soil          | dry   | 260000 |           | 437   | 874   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                            | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|-----------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-101-091417-8.2-10.2</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-03                        | %TS      | Soil          | NA    | 76.63  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-03                        | Al(WEN2) | Soil          | dry   | 3.78   |           | 0.097 | 0.322 | mg/kg | B180269 | 1800172  |
| 1803009-03                        | Al(WEN3) | Soil          | dry   | 191    |           | 0.161 | 0.322 | mg/kg | B180107 | 1800138  |
| 1803009-03                        | Al(WEN4) | Soil          | dry   | 199    |           | 0.210 | 0.419 | mg/kg | B180108 | 1800138  |
| 1803009-03                        | Al(WEN5) | Soil          | dry   | 4780   |           | 0.709 | 1.42  | mg/kg | B180272 | 1800172  |
| 1803009-03                        | Al(WEN6) | Soil          | dry   | 31400  | J-1       | 3.09  | 6.19  | mg/kg | B180110 | 1800138  |
| 1803009-03                        | As(WEN2) | Soil          | dry   | 294    |           | 0.064 | 0.129 | mg/kg | B180106 | 1800172  |
| 1803009-03                        | As(WEN3) | Soil          | dry   | 280    |           | 1.13  | 2.27  | mg/kg | B180270 | 1800172  |
| 1803009-03                        | As(WEN4) | Soil          | dry   | 18.6   |           | 1.35  | 2.71  | mg/kg | B180108 | 1800138  |
| 1803009-03                        | As(WEN5) | Soil          | dry   | 51.3   |           | 1.87  | 3.74  | mg/kg | B180109 | 1800138  |
| 1803009-03                        | As(WEN6) | Soil          | dry   | 6.97   |           | 2.58  | 5.16  | mg/kg | B180273 | 1800172  |
| 1803009-03                        | Fe(WEN2) | Soil          | dry   | 82.1   |           | 0.516 | 1.03  | mg/kg | B180106 | 1800138  |
| 1803009-03                        | Fe(WEN3) | Soil          | dry   | 2130   |           | 1.10  | 2.19  | mg/kg | B180107 | 1800138  |
| 1803009-03                        | Fe(WEN4) | Soil          | dry   | 1090   |           | 0.902 | 1.80  | mg/kg | B180108 | 1800138  |
| 1803009-03                        | Fe(WEN5) | Soil          | dry   | 6740   |           | 1.13  | 2.26  | mg/kg | B180272 | 1800172  |
| 1803009-03                        | Fe(WEN6) | Soil          | dry   | 25600  |           | 2.71  | 5.41  | mg/kg | B180110 | 1800138  |
| 1803009-03                        | Mn(WEN2) | Soil          | dry   | 3.39   |           | 0.011 | 0.032 | mg/kg | B180106 | 1800138  |
| 1803009-03                        | Mn(WEN3) | Soil          | dry   | 8.64   |           | 0.193 | 0.387 | mg/kg | B180107 | 1800138  |
| 1803009-03                        | Mn(WEN4) | Soil          | dry   | 4.54   |           | 0.168 | 0.355 | mg/kg | B180108 | 1800138  |
| 1803009-03                        | Mn(WEN5) | Soil          | dry   | 62.1   |           | 0.008 | 0.064 | mg/kg | B180272 | 1800172  |
| 1803009-03                        | Mn(WEN6) | Soil          | dry   | 517    |           | 0.089 | 0.516 | mg/kg | B180110 | 1800138  |
| 1803009-03                        | Si(WEN2) | Soil          | dry   | 51.0   |           | 0.483 | 3.22  | mg/kg | B180269 | 1800172  |
| 1803009-03                        | Si(WEN3) | Soil          | dry   | 56.4   |           | 1.68  | 3.55  | mg/kg | B180107 | 1800138  |
| 1803009-03                        | Si(WEN4) | Soil          | dry   | 142    |           | 2.26  | 4.51  | mg/kg | B180108 | 1800138  |
| 1803009-03                        | Si(WEN5) | Soil          | dry   | 167    |           | 0.967 | 6.45  | mg/kg | B180272 | 1800172  |
| 1803009-03                        | Si(WEN6) | Soil          | dry   | 261000 |           | 451   | 902   | mg/kg | B180230 | 1800156  |





## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-101-091417-19.3-20.3</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-04                         | %TS      | Soil          | NA    | 72.62  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-04                         | Al(WEN2) | Soil          | dry   | 11.5   |           | 0.102 | 0.341 | mg/kg | B180269 | 1800172  |
| 1803009-04                         | Al(WEN3) | Soil          | dry   | 510    |           | 0.170 | 0.341 | mg/kg | B180107 | 1800138  |
| 1803009-04                         | Al(WEN4) | Soil          | dry   | 569    |           | 0.221 | 0.443 | mg/kg | B180108 | 1800138  |
| 1803009-04                         | Al(WEN5) | Soil          | dry   | 9650   |           | 0.749 | 1.50  | mg/kg | B180272 | 1800172  |
| 1803009-04                         | Al(WEN6) | Soil          | dry   | 39500  | J-1       | 3.27  | 6.54  | mg/kg | B180110 | 1800138  |
| 1803009-04                         | As(WEN2) | Soil          | dry   | 190    |           | 0.068 | 0.136 | mg/kg | B180106 | 1800172  |
| 1803009-04                         | As(WEN3) | Soil          | dry   | 168    |           | 0.600 | 1.20  | mg/kg | B180270 | 1800172  |
| 1803009-04                         | As(WEN4) | Soil          | dry   | 10.8   |           | 1.43  | 2.86  | mg/kg | B180108 | 1800138  |
| 1803009-04                         | As(WEN5) | Soil          | dry   | 49.4   |           | 1.98  | 3.95  | mg/kg | B180109 | 1800138  |
| 1803009-04                         | As(WEN6) | Soil          | dry   | 4.94   | J         | 2.73  | 5.45  | mg/kg | B180273 | 1800172  |
| 1803009-04                         | Fe(WEN2) | Soil          | dry   | 9.75   |           | 0.545 | 1.09  | mg/kg | B180106 | 1800138  |
| 1803009-04                         | Fe(WEN3) | Soil          | dry   | 1340   |           | 1.16  | 2.32  | mg/kg | B180107 | 1800138  |
| 1803009-04                         | Fe(WEN4) | Soil          | dry   | 1040   |           | 0.954 | 1.91  | mg/kg | B180108 | 1800138  |
| 1803009-04                         | Fe(WEN5) | Soil          | dry   | 16300  |           | 1.19  | 2.38  | mg/kg | B180272 | 1800172  |
| 1803009-04                         | Fe(WEN6) | Soil          | dry   | 16600  |           | 2.86  | 5.72  | mg/kg | B180110 | 1800138  |
| 1803009-04                         | Mn(WEN2) | Soil          | dry   | 3.95   |           | 0.011 | 0.034 | mg/kg | B180106 | 1800138  |
| 1803009-04                         | Mn(WEN3) | Soil          | dry   | 6.12   |           | 0.204 | 0.409 | mg/kg | B180107 | 1800138  |
| 1803009-04                         | Mn(WEN4) | Soil          | dry   | 6.65   |           | 0.177 | 0.375 | mg/kg | B180108 | 1800138  |
| 1803009-04                         | Mn(WEN5) | Soil          | dry   | 127    |           | 0.009 | 0.068 | mg/kg | B180272 | 1800172  |
| 1803009-04                         | Mn(WEN6) | Soil          | dry   | 310    |           | 0.094 | 0.545 | mg/kg | B180110 | 1800138  |
| 1803009-04                         | Si(WEN2) | Soil          | dry   | 102    |           | 0.511 | 3.41  | mg/kg | B180269 | 1800172  |
| 1803009-04                         | Si(WEN3) | Soil          | dry   | 222    |           | 1.77  | 3.75  | mg/kg | B180107 | 1800138  |
| 1803009-04                         | Si(WEN4) | Soil          | dry   | 413    |           | 2.38  | 4.77  | mg/kg | B180108 | 1800138  |
| 1803009-04                         | Si(WEN5) | Soil          | dry   | 221    |           | 1.02  | 6.81  | mg/kg | B180272 | 1800172  |
| 1803009-04                         | Si(WEN6) | Soil          | dry   | 243000 |           | 477   | 954   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-121-091817-11.0-13.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-05                         | %TS      | Soil          | NA    | 80.65  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-05                         | Al(WEN2) | Soil          | dry   | 2.90   |           | 0.089 | 0.296 | mg/kg | B180269 | 1800172  |
| 1803009-05                         | Al(WEN3) | Soil          | dry   | 274    |           | 0.148 | 0.296 | mg/kg | B180107 | 1800138  |
| 1803009-05                         | Al(WEN4) | Soil          | dry   | 225    |           | 0.192 | 0.384 | mg/kg | B180108 | 1800138  |
| 1803009-05                         | Al(WEN5) | Soil          | dry   | 5120   |           | 0.650 | 1.30  | mg/kg | B180272 | 1800172  |
| 1803009-05                         | Al(WEN6) | Soil          | dry   | 33700  | J-1       | 2.84  | 5.67  | mg/kg | B180110 | 1800138  |
| 1803009-05                         | As(WEN2) | Soil          | dry   | 248    |           | 0.059 | 0.118 | mg/kg | B180106 | 1800172  |
| 1803009-05                         | As(WEN3) | Soil          | dry   | 181    |           | 0.520 | 1.04  | mg/kg | B180270 | 1800172  |
| 1803009-05                         | As(WEN4) | Soil          | dry   | 14.7   |           | 1.24  | 2.48  | mg/kg | B180108 | 1800138  |
| 1803009-05                         | As(WEN5) | Soil          | dry   | 162    |           | 15.4  | 30.7  | mg/kg | B180272 | 1800172  |
| 1803009-05                         | As(WEN6) | Soil          | dry   | 7.11   |           | 2.36  | 4.73  | mg/kg | B180273 | 1800172  |
| 1803009-05                         | Fe(WEN2) | Soil          | dry   | 97.9   |           | 0.473 | 0.946 | mg/kg | B180106 | 1800138  |
| 1803009-05                         | Fe(WEN3) | Soil          | dry   | 2420   |           | 1.00  | 2.01  | mg/kg | B180107 | 1800138  |
| 1803009-05                         | Fe(WEN4) | Soil          | dry   | 940    |           | 0.828 | 1.66  | mg/kg | B180108 | 1800138  |
| 1803009-05                         | Fe(WEN5) | Soil          | dry   | 8310   |           | 1.03  | 2.07  | mg/kg | B180272 | 1800172  |
| 1803009-05                         | Fe(WEN6) | Soil          | dry   | 23600  |           | 2.48  | 4.97  | mg/kg | B180110 | 1800138  |
| 1803009-05                         | Mn(WEN2) | Soil          | dry   | 2.75   |           | 0.010 | 0.030 | mg/kg | B180106 | 1800138  |
| 1803009-05                         | Mn(WEN3) | Soil          | dry   | 10.8   |           | 0.177 | 0.355 | mg/kg | B180107 | 1800138  |
| 1803009-05                         | Mn(WEN4) | Soil          | dry   | 3.75   |           | 0.154 | 0.325 | mg/kg | B180108 | 1800138  |
| 1803009-05                         | Mn(WEN5) | Soil          | dry   | 68.6   |           | 0.007 | 0.059 | mg/kg | B180272 | 1800172  |
| 1803009-05                         | Mn(WEN6) | Soil          | dry   | 454    |           | 0.082 | 0.473 | mg/kg | B180110 | 1800138  |
| 1803009-05                         | Si(WEN2) | Soil          | dry   | 75.7   |           | 0.443 | 2.96  | mg/kg | B180269 | 1800172  |
| 1803009-05                         | Si(WEN3) | Soil          | dry   | 92.2   |           | 1.54  | 3.25  | mg/kg | B180107 | 1800138  |
| 1803009-05                         | Si(WEN4) | Soil          | dry   | 166    |           | 2.07  | 4.14  | mg/kg | B180108 | 1800138  |
| 1803009-05                         | Si(WEN5) | Soil          | dry   | 191    |           | 0.887 | 5.91  | mg/kg | B180272 | 1800172  |
| 1803009-05                         | Si(WEN6) | Soil          | dry   | 264000 |           | 414   | 828   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-121-091817-22.0-24.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-06                         | %TS      | Soil          | NA    | 75.91  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-06                         | Al(WEN2) | Soil          | dry   | 5.58   |           | 0.094 | 0.312 | mg/kg | B180269 | 1800172  |
| 1803009-06                         | Al(WEN3) | Soil          | dry   | 140    |           | 0.156 | 0.312 | mg/kg | B180107 | 1800138  |
| 1803009-06                         | Al(WEN4) | Soil          | dry   | 191    |           | 0.203 | 0.405 | mg/kg | B180108 | 1800138  |
| 1803009-06                         | Al(WEN5) | Soil          | dry   | 3950   |           | 0.686 | 1.37  | mg/kg | B180272 | 1800172  |
| 1803009-06                         | Al(WEN6) | Soil          | dry   | 28600  | J-1       | 2.99  | 5.99  | mg/kg | B180110 | 1800138  |
| 1803009-06                         | As(WEN2) | Soil          | dry   | 10.2   |           | 0.016 | 0.031 | mg/kg | B180106 | 1800138  |
| 1803009-06                         | As(WEN3) | Soil          | dry   | 5.83   |           | 0.137 | 0.274 | mg/kg | B180270 | 1800172  |
| 1803009-06                         | As(WEN4) | Soil          | dry   | 1.42   | J         | 1.31  | 2.62  | mg/kg | B180108 | 1800138  |
| 1803009-06                         | As(WEN5) | Soil          | dry   | 9.73   |           | 1.81  | 3.62  | mg/kg | B180109 | 1800138  |
| 1803009-06                         | As(WEN6) | Soil          | dry   | 2.68   | J         | 2.49  | 4.99  | mg/kg | B180273 | 1800172  |
| 1803009-06                         | Fe(WEN2) | Soil          | dry   | 18.6   |           | 0.499 | 0.998 | mg/kg | B180106 | 1800138  |
| 1803009-06                         | Fe(WEN3) | Soil          | dry   | 292    |           | 1.06  | 2.12  | mg/kg | B180107 | 1800138  |
| 1803009-06                         | Fe(WEN4) | Soil          | dry   | 967    |           | 0.873 | 1.75  | mg/kg | B180108 | 1800138  |
| 1803009-06                         | Fe(WEN5) | Soil          | dry   | 8350   |           | 1.09  | 2.18  | mg/kg | B180272 | 1800172  |
| 1803009-06                         | Fe(WEN6) | Soil          | dry   | 27200  |           | 2.62  | 5.24  | mg/kg | B180110 | 1800138  |
| 1803009-06                         | Mn(WEN2) | Soil          | dry   | 1.33   |           | 0.010 | 0.031 | mg/kg | B180106 | 1800138  |
| 1803009-06                         | Mn(WEN3) | Soil          | dry   | 1.99   |           | 0.187 | 0.374 | mg/kg | B180107 | 1800138  |
| 1803009-06                         | Mn(WEN4) | Soil          | dry   | 4.10   |           | 0.162 | 0.343 | mg/kg | B180108 | 1800138  |
| 1803009-06                         | Mn(WEN5) | Soil          | dry   | 65.0   |           | 0.008 | 0.062 | mg/kg | B180272 | 1800172  |
| 1803009-06                         | Mn(WEN6) | Soil          | dry   | 546    |           | 0.086 | 0.499 | mg/kg | B180110 | 1800138  |
| 1803009-06                         | Si(WEN2) | Soil          | dry   | 35.2   |           | 0.468 | 3.12  | mg/kg | B180269 | 1800172  |
| 1803009-06                         | Si(WEN3) | Soil          | dry   | 61.9   |           | 1.62  | 3.43  | mg/kg | B180107 | 1800138  |
| 1803009-06                         | Si(WEN4) | Soil          | dry   | 147    |           | 2.18  | 4.37  | mg/kg | B180108 | 1800138  |
| 1803009-06                         | Si(WEN5) | Soil          | dry   | 134    |           | 0.936 | 6.24  | mg/kg | B180272 | 1800172  |
| 1803009-06                         | Si(WEN6) | Soil          | dry   | 261000 |           | 437   | 873   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                           | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|----------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-111-091817-6.0-8.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-07                       | %TS      | Soil          | NA    | 81.50  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-07                       | Al(WEN2) | Soil          | dry   | 11.8   |           | 0.090 | 0.299 | mg/kg | B180269 | 1800172  |
| 1803009-07                       | Al(WEN3) | Soil          | dry   | 3110   |           | 0.150 | 0.299 | mg/kg | B180107 | 1800138  |
| 1803009-07                       | Al(WEN4) | Soil          | dry   | 286    |           | 0.194 | 0.389 | mg/kg | B180108 | 1800138  |
| 1803009-07                       | Al(WEN5) | Soil          | dry   | 5790   |           | 0.658 | 1.32  | mg/kg | B180272 | 1800172  |
| 1803009-07                       | Al(WEN6) | Soil          | dry   | 29500  | J-1       | 2.87  | 5.74  | mg/kg | B180110 | 1800138  |
| 1803009-07                       | As(WEN2) | Soil          | dry   | 78.2   |           | 0.015 | 0.030 | mg/kg | B180106 | 1800138  |
| 1803009-07                       | As(WEN3) | Soil          | dry   | 479    |           | 2.63  | 5.27  | mg/kg | B180270 | 1800172  |
| 1803009-07                       | As(WEN4) | Soil          | dry   | 26.0   |           | 1.26  | 2.51  | mg/kg | B180108 | 1800138  |
| 1803009-07                       | As(WEN5) | Soil          | dry   | 46.4   |           | 1.74  | 3.47  | mg/kg | B180109 | 1800138  |
| 1803009-07                       | As(WEN6) | Soil          | dry   | 4.75   | J         | 2.39  | 4.79  | mg/kg | B180273 | 1800172  |
| 1803009-07                       | Fe(WEN2) | Soil          | dry   | 0.704  | J         | 0.479 | 0.957 | mg/kg | B180106 | 1800138  |
| 1803009-07                       | Fe(WEN3) | Soil          | dry   | 2360   |           | 1.02  | 2.03  | mg/kg | B180107 | 1800138  |
| 1803009-07                       | Fe(WEN4) | Soil          | dry   | 1290   |           | 0.838 | 1.68  | mg/kg | B180108 | 1800138  |
| 1803009-07                       | Fe(WEN5) | Soil          | dry   | 7340   |           | 1.05  | 2.09  | mg/kg | B180272 | 1800172  |
| 1803009-07                       | Fe(WEN6) | Soil          | dry   | 27700  |           | 2.51  | 5.03  | mg/kg | B180110 | 1800138  |
| 1803009-07                       | Mn(WEN2) | Soil          | dry   | 1.66   |           | 0.010 | 0.030 | mg/kg | B180106 | 1800138  |
| 1803009-07                       | Mn(WEN3) | Soil          | dry   | 14.1   |           | 0.179 | 0.359 | mg/kg | B180107 | 1800138  |
| 1803009-07                       | Mn(WEN4) | Soil          | dry   | 5.17   |           | 0.156 | 0.329 | mg/kg | B180108 | 1800138  |
| 1803009-07                       | Mn(WEN5) | Soil          | dry   | 68.5   |           | 0.007 | 0.060 | mg/kg | B180272 | 1800172  |
| 1803009-07                       | Mn(WEN6) | Soil          | dry   | 558    |           | 0.083 | 0.479 | mg/kg | B180110 | 1800138  |
| 1803009-07                       | Si(WEN2) | Soil          | dry   | 229    |           | 0.449 | 2.99  | mg/kg | B180269 | 1800172  |
| 1803009-07                       | Si(WEN3) | Soil          | dry   | 752    |           | 1.56  | 3.29  | mg/kg | B180107 | 1800138  |
| 1803009-07                       | Si(WEN4) | Soil          | dry   | 236    |           | 2.09  | 4.19  | mg/kg | B180108 | 1800138  |
| 1803009-07                       | Si(WEN5) | Soil          | dry   | 145    |           | 0.897 | 5.98  | mg/kg | B180272 | 1800172  |
| 1803009-07                       | Si(WEN6) | Soil          | dry   | 276000 |           | 419   | 838   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-111-091817-20.0-22.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-08                         | %TS      | Soil          | NA    | 78.04  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-08                         | Al(WEN2) | Soil          | dry   | 8.54   |           | 0.092 | 0.307 | mg/kg | B180269 | 1800172  |
| 1803009-08                         | Al(WEN3) | Soil          | dry   | 170    |           | 0.154 | 0.307 | mg/kg | B180107 | 1800138  |
| 1803009-08                         | Al(WEN4) | Soil          | dry   | 268    |           | 0.200 | 0.399 | mg/kg | B180108 | 1800138  |
| 1803009-08                         | Al(WEN5) | Soil          | dry   | 5140   |           | 0.676 | 1.35  | mg/kg | B180272 | 1800172  |
| 1803009-08                         | Al(WEN6) | Soil          | dry   | 36200  | J-1       | 2.95  | 5.90  | mg/kg | B180110 | 1800138  |
| 1803009-08                         | As(WEN2) | Soil          | dry   | 8.14   |           | 0.015 | 0.031 | mg/kg | B180106 | 1800138  |
| 1803009-08                         | As(WEN3) | Soil          | dry   | 9.05   |           | 0.135 | 0.270 | mg/kg | B180270 | 1800172  |
| 1803009-08                         | As(WEN4) | Soil          | dry   | 2.24   | J         | 1.29  | 2.58  | mg/kg | B180108 | 1800138  |
| 1803009-08                         | As(WEN5) | Soil          | dry   | 13.4   |           | 1.78  | 3.56  | mg/kg | B180109 | 1800138  |
| 1803009-08                         | As(WEN6) | Soil          | dry   | 2.87   | J         | 2.46  | 4.91  | mg/kg | B180273 | 1800172  |
| 1803009-08                         | Fe(WEN2) | Soil          | dry   | 8.12   |           | 0.491 | 0.983 | mg/kg | B180106 | 1800138  |
| 1803009-08                         | Fe(WEN3) | Soil          | dry   | 370    |           | 1.04  | 2.09  | mg/kg | B180107 | 1800138  |
| 1803009-08                         | Fe(WEN4) | Soil          | dry   | 671    |           | 0.860 | 1.72  | mg/kg | B180108 | 1800138  |
| 1803009-08                         | Fe(WEN5) | Soil          | dry   | 7640   |           | 1.08  | 2.15  | mg/kg | B180272 | 1800172  |
| 1803009-08                         | Fe(WEN6) | Soil          | dry   | 24600  |           | 2.58  | 5.16  | mg/kg | B180110 | 1800138  |
| 1803009-08                         | Mn(WEN2) | Soil          | dry   | 1.30   |           | 0.010 | 0.031 | mg/kg | B180106 | 1800138  |
| 1803009-08                         | Mn(WEN3) | Soil          | dry   | 2.10   |           | 0.184 | 0.369 | mg/kg | B180107 | 1800138  |
| 1803009-08                         | Mn(WEN4) | Soil          | dry   | 3.80   |           | 0.160 | 0.338 | mg/kg | B180108 | 1800138  |
| 1803009-08                         | Mn(WEN5) | Soil          | dry   | 59.2   |           | 0.008 | 0.061 | mg/kg | B180272 | 1800172  |
| 1803009-08                         | Mn(WEN6) | Soil          | dry   | 481    |           | 0.085 | 0.491 | mg/kg | B180110 | 1800138  |
| 1803009-08                         | Si(WEN2) | Soil          | dry   | 50.6   |           | 0.461 | 3.07  | mg/kg | B180269 | 1800172  |
| 1803009-08                         | Si(WEN3) | Soil          | dry   | 91.3   |           | 1.60  | 3.38  | mg/kg | B180107 | 1800138  |
| 1803009-08                         | Si(WEN4) | Soil          | dry   | 222    |           | 2.15  | 4.30  | mg/kg | B180108 | 1800138  |
| 1803009-08                         | Si(WEN5) | Soil          | dry   | 143    |           | 0.922 | 6.14  | mg/kg | B180272 | 1800172  |
| 1803009-08                         | Si(WEN6) | Soil          | dry   | 272000 |           | 430   | 860   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-204-091917-10.8-12.8</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-09                         | %TS      | Soil          | NA    | 70.56  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-09                         | Al(WEN2) | Soil          | dry   | 47.9   |           | 0.106 | 0.353 | mg/kg | B180269 | 1800172  |
| 1803009-09                         | Al(WEN3) | Soil          | dry   | 225    |           | 0.177 | 0.353 | mg/kg | B180107 | 1800138  |
| 1803009-09                         | Al(WEN4) | Soil          | dry   | 272    |           | 0.230 | 0.459 | mg/kg | B180108 | 1800138  |
| 1803009-09                         | Al(WEN5) | Soil          | dry   | 5900   |           | 0.777 | 1.55  | mg/kg | B180272 | 1800172  |
| 1803009-09                         | Al(WEN6) | Soil          | dry   | 37100  | J-1       | 3.39  | 6.78  | mg/kg | B180110 | 1800138  |
| 1803009-09                         | As(WEN2) | Soil          | dry   | 22.6   |           | 0.018 | 0.035 | mg/kg | B180106 | 1800138  |
| 1803009-09                         | As(WEN3) | Soil          | dry   | 2.77   |           | 0.155 | 0.311 | mg/kg | B180270 | 1800172  |
| 1803009-09                         | As(WEN4) | Soil          | dry   | ≤ 1.48 | U         | 1.48  | 2.97  | mg/kg | B180108 | 1800138  |
| 1803009-09                         | As(WEN5) | Soil          | dry   | 10.9   |           | 2.05  | 4.10  | mg/kg | B180109 | 1800138  |
| 1803009-09                         | As(WEN6) | Soil          | dry   | 3.40   | J         | 2.83  | 5.65  | mg/kg | B180273 | 1800172  |
| 1803009-09                         | Fe(WEN2) | Soil          | dry   | 35.9   |           | 0.565 | 1.13  | mg/kg | B180106 | 1800138  |
| 1803009-09                         | Fe(WEN3) | Soil          | dry   | 578    |           | 1.20  | 2.40  | mg/kg | B180107 | 1800138  |
| 1803009-09                         | Fe(WEN4) | Soil          | dry   | 949    |           | 0.989 | 1.98  | mg/kg | B180108 | 1800138  |
| 1803009-09                         | Fe(WEN5) | Soil          | dry   | 8530   |           | 1.24  | 2.47  | mg/kg | B180272 | 1800172  |
| 1803009-09                         | Fe(WEN6) | Soil          | dry   | 22600  |           | 2.97  | 5.93  | mg/kg | B180110 | 1800138  |
| 1803009-09                         | Mn(WEN2) | Soil          | dry   | 0.761  |           | 0.012 | 0.035 | mg/kg | B180106 | 1800138  |
| 1803009-09                         | Mn(WEN3) | Soil          | dry   | 3.92   |           | 0.212 | 0.424 | mg/kg | B180107 | 1800138  |
| 1803009-09                         | Mn(WEN4) | Soil          | dry   | 4.35   |           | 0.184 | 0.389 | mg/kg | B180108 | 1800138  |
| 1803009-09                         | Mn(WEN5) | Soil          | dry   | 57.5   |           | 0.009 | 0.071 | mg/kg | B180272 | 1800172  |
| 1803009-09                         | Mn(WEN6) | Soil          | dry   | 430    |           | 0.097 | 0.565 | mg/kg | B180110 | 1800138  |
| 1803009-09                         | Si(WEN2) | Soil          | dry   | 8700   |           | 0.530 | 3.53  | mg/kg | B180269 | 1800172  |
| 1803009-09                         | Si(WEN3) | Soil          | dry   | 182    |           | 1.84  | 3.89  | mg/kg | B180107 | 1800138  |
| 1803009-09                         | Si(WEN4) | Soil          | dry   | 200    |           | 2.47  | 4.94  | mg/kg | B180108 | 1800138  |
| 1803009-09                         | Si(WEN5) | Soil          | dry   | 167    |           | 1.06  | 7.06  | mg/kg | B180272 | 1800172  |
| 1803009-09                         | Si(WEN6) | Soil          | dry   | 249000 |           | 494   | 989   | mg/kg | B180230 | 1800156  |





## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-204-091917-23.0-25.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-10                         | %TS      | Soil          | NA    | 81.69  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-10                         | Al(WEN2) | Soil          | dry   | 0.620  |           | 0.086 | 0.286 | mg/kg | B180269 | 1800172  |
| 1803009-10                         | Al(WEN3) | Soil          | dry   | 86.5   |           | 0.143 | 0.286 | mg/kg | B180107 | 1800138  |
| 1803009-10                         | Al(WEN4) | Soil          | dry   | 143    |           | 0.186 | 0.372 | mg/kg | B180108 | 1800138  |
| 1803009-10                         | Al(WEN5) | Soil          | dry   | 4600   |           | 0.630 | 1.26  | mg/kg | B180272 | 1800172  |
| 1803009-10                         | Al(WEN6) | Soil          | dry   | 28800  | J-1       | 2.75  | 5.50  | mg/kg | B180110 | 1800138  |
| 1803009-10                         | As(WEN2) | Soil          | dry   | 29.0   |           | 0.014 | 0.029 | mg/kg | B180106 | 1800138  |
| 1803009-10                         | As(WEN3) | Soil          | dry   | 8.33   |           | 0.126 | 0.252 | mg/kg | B180270 | 1800172  |
| 1803009-10                         | As(WEN4) | Soil          | dry   | 3.89   |           | 1.20  | 2.40  | mg/kg | B180108 | 1800138  |
| 1803009-10                         | As(WEN5) | Soil          | dry   | 64.4   |           | 3.72  | 7.44  | mg/kg | B180272 | 1800172  |
| 1803009-10                         | As(WEN6) | Soil          | dry   | 3.62   | J         | 2.29  | 4.58  | mg/kg | B180273 | 1800172  |
| 1803009-10                         | Fe(WEN2) | Soil          | dry   | 4.87   |           | 0.458 | 0.916 | mg/kg | B180106 | 1800138  |
| 1803009-10                         | Fe(WEN3) | Soil          | dry   | 1470   |           | 0.973 | 1.95  | mg/kg | B180107 | 1800138  |
| 1803009-10                         | Fe(WEN4) | Soil          | dry   | 588    |           | 0.802 | 1.60  | mg/kg | B180108 | 1800138  |
| 1803009-10                         | Fe(WEN5) | Soil          | dry   | 9890   |           | 1.00  | 2.00  | mg/kg | B180272 | 1800172  |
| 1803009-10                         | Fe(WEN6) | Soil          | dry   | 27200  |           | 2.40  | 4.81  | mg/kg | B180110 | 1800138  |
| 1803009-10                         | Mn(WEN2) | Soil          | dry   | 3.34   |           | 0.009 | 0.029 | mg/kg | B180106 | 1800138  |
| 1803009-10                         | Mn(WEN3) | Soil          | dry   | 11.9   |           | 0.172 | 0.344 | mg/kg | B180107 | 1800138  |
| 1803009-10                         | Mn(WEN4) | Soil          | dry   | 5.38   |           | 0.149 | 0.315 | mg/kg | B180108 | 1800138  |
| 1803009-10                         | Mn(WEN5) | Soil          | dry   | 99.4   |           | 0.007 | 0.057 | mg/kg | B180272 | 1800172  |
| 1803009-10                         | Mn(WEN6) | Soil          | dry   | 534    |           | 0.079 | 0.458 | mg/kg | B180110 | 1800138  |
| 1803009-10                         | Si(WEN2) | Soil          | dry   | 380    |           | 0.429 | 2.86  | mg/kg | B180269 | 1800172  |
| 1803009-10                         | Si(WEN3) | Soil          | dry   | 151    |           | 1.49  | 3.15  | mg/kg | B180107 | 1800138  |
| 1803009-10                         | Si(WEN4) | Soil          | dry   | 207    |           | 2.00  | 4.01  | mg/kg | B180108 | 1800138  |
| 1803009-10                         | Si(WEN5) | Soil          | dry   | 195    |           | 0.859 | 5.73  | mg/kg | B180272 | 1800172  |
| 1803009-10                         | Si(WEN6) | Soil          | dry   | 280000 |           | 401   | 802   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                            | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|-----------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-113-092017-7.5-10.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-11                        | %TS      | Soil          | NA    | 79.41  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-11                        | Al(WEN2) | Soil          | dry   | 4.50   |           | 0.090 | 0.302 | mg/kg | B180269 | 1800172  |
| 1803009-11                        | Al(WEN3) | Soil          | dry   | 534    |           | 0.151 | 0.302 | mg/kg | B180107 | 1800138  |
| 1803009-11                        | Al(WEN4) | Soil          | dry   | 251    |           | 0.196 | 0.392 | mg/kg | B180108 | 1800138  |
| 1803009-11                        | Al(WEN5) | Soil          | dry   | 4940   |           | 0.663 | 1.33  | mg/kg | B180272 | 1800172  |
| 1803009-11                        | Al(WEN6) | Soil          | dry   | 29800  | J-1       | 2.90  | 5.79  | mg/kg | B180110 | 1800138  |
| 1803009-11                        | As(WEN2) | Soil          | dry   | 53.6   |           | 0.015 | 0.030 | mg/kg | B180106 | 1800138  |
| 1803009-11                        | As(WEN3) | Soil          | dry   | 276    |           | 1.06  | 2.12  | mg/kg | B180270 | 1800172  |
| 1803009-11                        | As(WEN4) | Soil          | dry   | 20.2   |           | 1.27  | 2.53  | mg/kg | B180108 | 1800138  |
| 1803009-11                        | As(WEN5) | Soil          | dry   | 33.1   |           | 1.75  | 3.50  | mg/kg | B180109 | 1800138  |
| 1803009-11                        | As(WEN6) | Soil          | dry   | 4.59   | J         | 2.41  | 4.83  | mg/kg | B180273 | 1800172  |
| 1803009-11                        | Fe(WEN2) | Soil          | dry   | 17.6   |           | 0.483 | 0.965 | mg/kg | B180106 | 1800138  |
| 1803009-11                        | Fe(WEN3) | Soil          | dry   | 4880   |           | 1.03  | 2.05  | mg/kg | B180107 | 1800138  |
| 1803009-11                        | Fe(WEN4) | Soil          | dry   | 1400   |           | 0.844 | 1.69  | mg/kg | B180108 | 1800138  |
| 1803009-11                        | Fe(WEN5) | Soil          | dry   | 7380   |           | 1.06  | 2.11  | mg/kg | B180272 | 1800172  |
| 1803009-11                        | Fe(WEN6) | Soil          | dry   | 25300  |           | 2.53  | 5.07  | mg/kg | B180110 | 1800138  |
| 1803009-11                        | Mn(WEN2) | Soil          | dry   | 3.20   |           | 0.010 | 0.030 | mg/kg | B180106 | 1800138  |
| 1803009-11                        | Mn(WEN3) | Soil          | dry   | 7.99   |           | 0.181 | 0.362 | mg/kg | B180107 | 1800138  |
| 1803009-11                        | Mn(WEN4) | Soil          | dry   | 4.94   |           | 0.157 | 0.332 | mg/kg | B180108 | 1800138  |
| 1803009-11                        | Mn(WEN5) | Soil          | dry   | 68.6   |           | 0.008 | 0.060 | mg/kg | B180272 | 1800172  |
| 1803009-11                        | Mn(WEN6) | Soil          | dry   | 513    |           | 0.083 | 0.483 | mg/kg | B180110 | 1800138  |
| 1803009-11                        | Si(WEN2) | Soil          | dry   | 122    |           | 0.452 | 3.02  | mg/kg | B180269 | 1800172  |
| 1803009-11                        | Si(WEN3) | Soil          | dry   | 275    |           | 1.57  | 3.32  | mg/kg | B180107 | 1800138  |
| 1803009-11                        | Si(WEN4) | Soil          | dry   | 191    |           | 2.11  | 4.22  | mg/kg | B180108 | 1800138  |
| 1803009-11                        | Si(WEN5) | Soil          | dry   | 196    |           | 0.905 | 6.03  | mg/kg | B180272 | 1800172  |
| 1803009-11                        | Si(WEN6) | Soil          | dry   | 270000 |           | 422   | 844   | mg/kg | B180230 | 1800156  |





## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-113-092017-18.0-20.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-12                         | %TS      | Soil          | NA    | 68.45  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-12                         | Al(WEN2) | Soil          | dry   | 75.4   |           | 0.108 | 0.360 | mg/kg | B180269 | 1800172  |
| 1803009-12                         | Al(WEN3) | Soil          | dry   | 367    |           | 0.180 | 0.360 | mg/kg | B180107 | 1800138  |
| 1803009-12                         | Al(WEN4) | Soil          | dry   | 560    |           | 0.234 | 0.468 | mg/kg | B180108 | 1800138  |
| 1803009-12                         | Al(WEN5) | Soil          | dry   | 8950   |           | 0.791 | 1.58  | mg/kg | B180272 | 1800172  |
| 1803009-12                         | Al(WEN6) | Soil          | dry   | 40800  | J-1       | 3.45  | 6.91  | mg/kg | B180110 | 1800138  |
| 1803009-12                         | As(WEN2) | Soil          | dry   | 896    |           | 0.719 | 1.44  | mg/kg | B180106 | 1800172  |
| 1803009-12                         | As(WEN3) | Soil          | dry   | 127    |           | 0.633 | 1.27  | mg/kg | B180270 | 1800172  |
| 1803009-12                         | As(WEN4) | Soil          | dry   | 29.5   |           | 1.51  | 3.02  | mg/kg | B180108 | 1800138  |
| 1803009-12                         | As(WEN5) | Soil          | dry   | 1140   |           | 93.5  | 187   | mg/kg | B180272 | 1800172  |
| 1803009-12                         | As(WEN6) | Soil          | dry   | 11.9   |           | 2.88  | 5.75  | mg/kg | B180273 | 1800172  |
| 1803009-12                         | Fe(WEN2) | Soil          | dry   | 52.3   |           | 0.575 | 1.15  | mg/kg | B180106 | 1800138  |
| 1803009-12                         | Fe(WEN3) | Soil          | dry   | 213    |           | 1.22  | 2.45  | mg/kg | B180107 | 1800138  |
| 1803009-12                         | Fe(WEN4) | Soil          | dry   | 999    |           | 1.01  | 2.01  | mg/kg | B180108 | 1800138  |
| 1803009-12                         | Fe(WEN5) | Soil          | dry   | 9770   |           | 1.26  | 2.52  | mg/kg | B180272 | 1800172  |
| 1803009-12                         | Fe(WEN6) | Soil          | dry   | 21600  |           | 3.02  | 6.04  | mg/kg | B180110 | 1800138  |
| 1803009-12                         | Mn(WEN2) | Soil          | dry   | 1.93   |           | 0.012 | 0.036 | mg/kg | B180106 | 1800138  |
| 1803009-12                         | Mn(WEN3) | Soil          | dry   | 3.91   |           | 0.216 | 0.432 | mg/kg | B180107 | 1800138  |
| 1803009-12                         | Mn(WEN4) | Soil          | dry   | 5.43   |           | 0.187 | 0.396 | mg/kg | B180108 | 1800138  |
| 1803009-12                         | Mn(WEN5) | Soil          | dry   | 51.5   |           | 0.009 | 0.072 | mg/kg | B180272 | 1800172  |
| 1803009-12                         | Mn(WEN6) | Soil          | dry   | 398    |           | 0.099 | 0.575 | mg/kg | B180110 | 1800138  |
| 1803009-12                         | Si(WEN2) | Soil          | dry   | 151    |           | 0.539 | 3.60  | mg/kg | B180269 | 1800172  |
| 1803009-12                         | Si(WEN3) | Soil          | dry   | 132    |           | 1.87  | 3.96  | mg/kg | B180107 | 1800138  |
| 1803009-12                         | Si(WEN4) | Soil          | dry   | 424    |           | 2.52  | 5.04  | mg/kg | B180108 | 1800138  |
| 1803009-12                         | Si(WEN5) | Soil          | dry   | 227    |           | 1.08  | 7.19  | mg/kg | B180272 | 1800172  |
| 1803009-12                         | Si(WEN6) | Soil          | dry   | 257000 |           | 504   | 1010  | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-129-092017-10.0-12.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-13                         | %TS      | Soil          | NA    | 83.76  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-13                         | Al(WEN2) | Soil          | dry   | 2.29   |           | 0.086 | 0.285 | mg/kg | B180269 | 1800172  |
| 1803009-13                         | Al(WEN3) | Soil          | dry   | 333    |           | 0.143 | 0.285 | mg/kg | B180107 | 1800138  |
| 1803009-13                         | Al(WEN4) | Soil          | dry   | 166    |           | 0.186 | 0.371 | mg/kg | B180108 | 1800138  |
| 1803009-13                         | Al(WEN5) | Soil          | dry   | 4420   |           | 0.628 | 1.26  | mg/kg | B180272 | 1800172  |
| 1803009-13                         | Al(WEN6) | Soil          | dry   | 23900  | J-1       | 2.74  | 5.48  | mg/kg | B180110 | 1800138  |
| 1803009-13                         | As(WEN2) | Soil          | dry   | 46.5   |           | 0.014 | 0.029 | mg/kg | B180106 | 1800138  |
| 1803009-13                         | As(WEN3) | Soil          | dry   | 402    |           | 2.51  | 5.02  | mg/kg | B180270 | 1800172  |
| 1803009-13                         | As(WEN4) | Soil          | dry   | 15.2   |           | 1.20  | 2.40  | mg/kg | B180108 | 1800138  |
| 1803009-13                         | As(WEN5) | Soil          | dry   | 17.2   | M         | 1.66  | 3.31  | mg/kg | B180109 | 1800138  |
| 1803009-13                         | As(WEN6) | Soil          | dry   | 3.58   | J         | 2.28  | 4.57  | mg/kg | B180273 | 1800172  |
| 1803009-13                         | Fe(WEN2) | Soil          | dry   | 3.91   |           | 0.457 | 0.913 | mg/kg | B180106 | 1800138  |
| 1803009-13                         | Fe(WEN3) | Soil          | dry   | 7010   |           | 0.970 | 1.94  | mg/kg | B180107 | 1800138  |
| 1803009-13                         | Fe(WEN4) | Soil          | dry   | 1150   |           | 0.799 | 1.60  | mg/kg | B180108 | 1800138  |
| 1803009-13                         | Fe(WEN5) | Soil          | dry   | 6120   |           | 0.999 | 2.00  | mg/kg | B180272 | 1800172  |
| 1803009-13                         | Fe(WEN6) | Soil          | dry   | 30500  |           | 2.40  | 4.80  | mg/kg | B180110 | 1800138  |
| 1803009-13                         | Mn(WEN2) | Soil          | dry   | 2.61   | M         | 0.009 | 0.029 | mg/kg | B180106 | 1800138  |
| 1803009-13                         | Mn(WEN3) | Soil          | dry   | 27.7   | M         | 0.171 | 0.343 | mg/kg | B180107 | 1800138  |
| 1803009-13                         | Mn(WEN4) | Soil          | dry   | 4.44   |           | 0.148 | 0.314 | mg/kg | B180108 | 1800138  |
| 1803009-13                         | Mn(WEN5) | Soil          | dry   | 56.8   |           | 0.007 | 0.057 | mg/kg | B180272 | 1800172  |
| 1803009-13                         | Mn(WEN6) | Soil          | dry   | 627    |           | 0.079 | 0.457 | mg/kg | B180110 | 1800138  |
| 1803009-13                         | Si(WEN2) | Soil          | dry   | 190    |           | 0.428 | 2.85  | mg/kg | B180269 | 1800172  |
| 1803009-13                         | Si(WEN3) | Soil          | dry   | 549    |           | 1.48  | 3.14  | mg/kg | B180107 | 1800138  |
| 1803009-13                         | Si(WEN4) | Soil          | dry   | 140    |           | 2.00  | 4.00  | mg/kg | B180108 | 1800138  |
| 1803009-13                         | Si(WEN5) | Soil          | dry   | 162    |           | 0.856 | 5.71  | mg/kg | B180272 | 1800172  |
| 1803009-13                         | Si(WEN6) | Soil          | dry   | 256000 |           | 400   | 799   | mg/kg | B180230 | 1800156  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-129-092017-22.5-25.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1803009-14                         | %TS      | Soil          | NA    | 81.98  |           | 0.004 | 0.01  | %     | B180177 | N/A      |
| 1803009-14                         | Al(WEN2) | Soil          | dry   | 3.48   |           | 0.090 | 0.301 | mg/kg | B180269 | 1800172  |
| 1803009-14                         | Al(WEN3) | Soil          | dry   | 149    |           | 0.151 | 0.301 | mg/kg | B180107 | 1800138  |
| 1803009-14                         | Al(WEN4) | Soil          | dry   | 208    |           | 0.196 | 0.391 | mg/kg | B180108 | 1800138  |
| 1803009-14                         | Al(WEN5) | Soil          | dry   | 4650   |           | 0.662 | 1.32  | mg/kg | B180272 | 1800172  |
| 1803009-14                         | Al(WEN6) | Soil          | dry   | 27200  | J-1       | 2.89  | 5.78  | mg/kg | B180110 | 1800138  |
| 1803009-14                         | As(WEN2) | Soil          | dry   | 25.8   |           | 0.015 | 0.030 | mg/kg | B180106 | 1800138  |
| 1803009-14                         | As(WEN3) | Soil          | dry   | 22.7   |           | 0.132 | 0.265 | mg/kg | B180270 | 1800172  |
| 1803009-14                         | As(WEN4) | Soil          | dry   | 6.31   |           | 1.26  | 2.53  | mg/kg | B180108 | 1800138  |
| 1803009-14                         | As(WEN5) | Soil          | dry   | 267    |           | 1.75  | 3.49  | mg/kg | B180109 | 1800138  |
| 1803009-14                         | As(WEN6) | Soil          | dry   | 4.31   | J         | 2.41  | 4.82  | mg/kg | B180273 | 1800172  |
| 1803009-14                         | Fe(WEN2) | Soil          | dry   | 20.3   |           | 0.482 | 0.964 | mg/kg | B180106 | 1800138  |
| 1803009-14                         | Fe(WEN3) | Soil          | dry   | 1320   |           | 1.02  | 2.05  | mg/kg | B180107 | 1800138  |
| 1803009-14                         | Fe(WEN4) | Soil          | dry   | 1070   |           | 0.843 | 1.69  | mg/kg | B180108 | 1800138  |
| 1803009-14                         | Fe(WEN5) | Soil          | dry   | 6240   |           | 1.05  | 2.11  | mg/kg | B180272 | 1800172  |
| 1803009-14                         | Fe(WEN6) | Soil          | dry   | 29600  |           | 2.53  | 5.06  | mg/kg | B180110 | 1800138  |
| 1803009-14                         | Mn(WEN2) | Soil          | dry   | 2.66   |           | 0.010 | 0.030 | mg/kg | B180106 | 1800138  |
| 1803009-14                         | Mn(WEN3) | Soil          | dry   | 5.13   |           | 0.181 | 0.361 | mg/kg | B180107 | 1800138  |
| 1803009-14                         | Mn(WEN4) | Soil          | dry   | 4.16   |           | 0.157 | 0.331 | mg/kg | B180108 | 1800138  |
| 1803009-14                         | Mn(WEN5) | Soil          | dry   | 49.9   |           | 0.008 | 0.060 | mg/kg | B180272 | 1800172  |
| 1803009-14                         | Mn(WEN6) | Soil          | dry   | 597    |           | 0.083 | 0.482 | mg/kg | B180110 | 1800138  |
| 1803009-14                         | Si(WEN2) | Soil          | dry   | 65.7   |           | 0.452 | 3.01  | mg/kg | B180269 | 1800172  |
| 1803009-14                         | Si(WEN3) | Soil          | dry   | 84.4   |           | 1.57  | 3.31  | mg/kg | B180107 | 1800138  |
| 1803009-14                         | Si(WEN4) | Soil          | dry   | 163    |           | 2.11  | 4.22  | mg/kg | B180108 | 1800138  |
| 1803009-14                         | Si(WEN5) | Soil          | dry   | 200    |           | 0.903 | 6.02  | mg/kg | B180272 | 1800172  |
| 1803009-14                         | Si(WEN6) | Soil          | dry   | 260000 |           | 422   | 843   | mg/kg | B180230 | 1800156  |



## Accuracy & Precision Summary

Batch: B180106  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B180106-DUP1</b> | <b>Duplicate, (1803009-10)</b>  |        |       |        |       |              |              |
|                     | As(WEN2)                        | 28.98  |       | 33.13  | mg/kg |              | 13% 25       |
|                     | Fe(WEN2)                        | 4.875  |       | 5.098  | mg/kg |              | 4% 25        |
|                     | Mn(WEN2)                        | 3.338  |       | 3.434  | mg/kg |              | 3% 25        |
| <b>B180106-PS1</b>  | <b>Post Spike, (1803009-10)</b> |        |       |        |       |              |              |
|                     | As(WEN2)                        | 28.98  | 7.157 | 35.93  | mg/kg | 97% 75-125   |              |
|                     | Fe(WEN2)                        | 4.875  | 71.57 | 73.62  | mg/kg | 96% 75-125   |              |
|                     | Mn(WEN2)                        | 3.338  | 7.157 | 10.21  | mg/kg | 96% 75-125   |              |
| <b>B180106-PS2</b>  | <b>Post Spike, (1803009-10)</b> |        |       |        |       |              |              |
|                     | As(WEN2)                        | 28.98  | 7.157 | 36.12  | mg/kg | 100% 75-125  |              |
|                     | Fe(WEN2)                        | 4.875  | 71.57 | 75.63  | mg/kg | 99% 75-125   |              |
|                     | Mn(WEN2)                        | 3.338  | 7.157 | 10.43  | mg/kg | 99% 75-125   |              |
| <b>B180106-DUP2</b> | <b>Duplicate, (1803009-13)</b>  |        |       |        |       |              |              |
|                     | As(WEN2)                        | 46.53  |       | 43.48  | mg/kg |              | 7% 25        |
|                     | Fe(WEN2)                        | 3.915  |       | 5.034  | mg/kg |              | 25% 25       |
|                     | Mn(WEN2)                        | 2.615  |       | 1.828  | mg/kg |              | 35% 25       |
| <b>B180106-PS3</b>  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|                     | As(WEN2)                        | 46.53  | 7.136 | 54.27  | mg/kg | 108% 75-125  |              |
|                     | Fe(WEN2)                        | 3.915  | 71.36 | 75.42  | mg/kg | 100% 75-125  |              |
|                     | Mn(WEN2)                        | 2.615  | 7.136 | 9.805  | mg/kg | 101% 75-125  |              |
| <b>B180106-PS4</b>  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|                     | As(WEN2)                        | 46.53  | 7.136 | 52.58  | mg/kg | 85% 75-125   |              |
|                     | Fe(WEN2)                        | 3.915  | 71.36 | 67.81  | mg/kg | 90% 75-125   |              |
|                     | Mn(WEN2)                        | 2.615  | 7.136 | 9.036  | mg/kg | 90% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180107  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B180107-DUP1</b> | <b>Duplicate, (1803009-10)</b>  |        |       |        |       |              |              |
|                     | Al(WEN3)                        | 86.49  |       | 88.34  | mg/kg |              | 2% 25        |
|                     | Fe(WEN3)                        | 1466   |       | 1447   | mg/kg |              | 1% 25        |
|                     | Mn(WEN3)                        | 11.91  |       | 12.00  | mg/kg |              | 0.7% 25      |
|                     | Si(WEN3)                        | 150.6  |       | 156.7  | mg/kg |              | 4% 25        |
| <b>B180107-PS1</b>  | <b>Post Spike, (1803009-10)</b> |        |       |        |       |              |              |
|                     | Al(WEN3)                        | 86.49  | 71.57 | 148.7  | mg/kg | 87% 75-125   |              |
|                     | Fe(WEN3)                        | 1466   | 71.57 | 1497   | mg/kg | 44% 75-125   |              |
|                     | Mn(WEN3)                        | 11.91  | 7.157 | 18.30  | mg/kg | 89% 75-125   |              |
|                     | Si(WEN3)                        | 150.6  | 715.7 | 860.4  | mg/kg | 99% 75-125   |              |
| <b>B180107-PS2</b>  | <b>Post Spike, (1803009-10)</b> |        |       |        |       |              |              |
|                     | Al(WEN3)                        | 86.49  | 71.57 | 153.3  | mg/kg | 93% 75-125   |              |
|                     | Fe(WEN3)                        | 1466   | 71.57 | 1515   | mg/kg | 69% 75-125   |              |
|                     | Mn(WEN3)                        | 11.91  | 7.157 | 18.77  | mg/kg | 96% 75-125   |              |
|                     | Si(WEN3)                        | 150.6  | 715.7 | 880.8  | mg/kg | 102% 75-125  |              |
| <b>B180107-DUP2</b> | <b>Duplicate, (1803009-13)</b>  |        |       |        |       |              |              |
|                     | Al(WEN3)                        | 332.9  |       | 308.2  | mg/kg |              | 8% 25        |
|                     | Fe(WEN3)                        | 7007   |       | 6305   | mg/kg |              | 11% 25       |
|                     | Mn(WEN3)                        | 27.69  |       | 16.32  | mg/kg |              | 52% 25       |
|                     | Si(WEN3)                        | 548.7  |       | 488.0  | mg/kg |              | 12% 25       |
| <b>B180107-PS3</b>  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|                     | Al(WEN3)                        | 332.9  | 71.36 | 391.1  | mg/kg | 82% 75-125   |              |
|                     | Fe(WEN3)                        | 7007   | 71.36 | 7065   | mg/kg | 82% 75-125   |              |
|                     | Mn(WEN3)                        | 27.69  | 7.136 | 34.10  | mg/kg | 90% 75-125   |              |
|                     | Si(WEN3)                        | 548.7  | 713.6 | 1201   | mg/kg | 91% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1803009  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap

## Accuracy & Precision Summary

**Batch:** B180107  
**Lab Matrix:** Soil/Sediment  
**Method:** In-House

| Sample      | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180107-PS4 | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|             | Al(WEN3)                        | 332.9  | 71.36 | 387.7  | mg/kg | 77% 75-125   |              |
|             | Fe(WEN3)                        | 7007   | 71.36 | 6885   | mg/kg | -170% 75-125 |              |
|             | Mn(WEN3)                        | 27.69  | 7.136 | 33.45  | mg/kg | 81% 75-125   |              |
|             | Si(WEN3)                        | 548.7  | 713.6 | 1164   | mg/kg | 86% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180108  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B180108-DUP1</b> | <b>Duplicate, (1803009-10)</b>  |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 142.6  |       | 160.4  | mg/kg |              | 12% 25       |
|                     | As(WEN4)                        | 3.888  |       | 3.988  | mg/kg |              | 3% 25        |
|                     | Fe(WEN4)                        | 588.5  |       | 607.4  | mg/kg |              | 3% 25        |
|                     | Mn(WEN4)                        | 5.378  |       | 5.500  | mg/kg |              | 2% 25        |
|                     | Si(WEN4)                        | 206.9  |       | 216.4  | mg/kg |              | 4% 25        |
| <b>B180108-PS1</b>  | <b>Post Spike, (1803009-10)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 142.6  | 71.57 | 211.8  | mg/kg | 97% 75-125   |              |
|                     | As(WEN4)                        | 3.888  | 7.157 | 10.66  | mg/kg | 95% 75-125   |              |
|                     | Fe(WEN4)                        | 588.5  | 71.57 | 672.8  | mg/kg | 118% 75-125  |              |
|                     | Mn(WEN4)                        | 5.378  | 7.157 | 12.20  | mg/kg | 95% 75-125   |              |
|                     | Si(WEN4)                        | 206.9  | 715.7 | 920.2  | mg/kg | 100% 75-125  |              |
| <b>B180108-PS2</b>  | <b>Post Spike, (1803009-10)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 142.6  | 71.57 | 211.0  | mg/kg | 96% 75-125   |              |
|                     | As(WEN4)                        | 3.888  | 7.157 | 10.43  | mg/kg | 91% 75-125   |              |
|                     | Fe(WEN4)                        | 588.5  | 71.57 | 668.9  | mg/kg | 112% 75-125  |              |
|                     | Mn(WEN4)                        | 5.378  | 7.157 | 12.06  | mg/kg | 93% 75-125   |              |
|                     | Si(WEN4)                        | 206.9  | 715.7 | 913.4  | mg/kg | 99% 75-125   |              |
| <b>B180108-DUP2</b> | <b>Duplicate, (1803009-13)</b>  |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 166.4  |       | 202.6  | mg/kg |              | 20% 25       |
|                     | As(WEN4)                        | 15.21  |       | 15.73  | mg/kg |              | 3% 25        |
|                     | Fe(WEN4)                        | 1155   |       | 1337   | mg/kg |              | 15% 25       |
|                     | Mn(WEN4)                        | 4.444  |       | 5.618  | mg/kg |              | 23% 25       |
|                     | Si(WEN4)                        | 140.3  |       | 168.3  | mg/kg |              | 18% 25       |
| <b>B180108-PS3</b>  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 166.4  | 71.36 | 234.5  | mg/kg | 95% 75-125   |              |
|                     | As(WEN4)                        | 15.21  | 7.136 | 22.23  | mg/kg | 98% 75-125   |              |
|                     | Fe(WEN4)                        | 1155   | 71.36 | 1232   | mg/kg | 109% 75-125  |              |
|                     | Mn(WEN4)                        | 4.444  | 7.136 | 11.28  | mg/kg | 96% 75-125   |              |
|                     | Si(WEN4)                        | 140.3  | 713.6 | 865.2  | mg/kg | 102% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180108  
Lab Matrix: Soil/Sediment  
Method: In-House

| Sample      | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180108-PS4 | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|             | Al(WEN4)                        | 166.4  | 71.36 | 233.9  | mg/kg | 95% 75-125   |              |
|             | As(WEN4)                        | 15.21  | 7.136 | 22.09  | mg/kg | 96% 75-125   |              |
|             | Fe(WEN4)                        | 1155   | 71.36 | 1234   | mg/kg | 112% 75-125  |              |
|             | Mn(WEN4)                        | 4.444  | 7.136 | 11.34  | mg/kg | 97% 75-125   |              |
|             | Si(WEN4)                        | 140.3  | 713.6 | 861.2  | mg/kg | 101% 75-125  |              |





## Accuracy & Precision Summary

Batch: B180109  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B180109-BS1  | Blank Spike, (1804031)<br>As(WEN5)   |        | 25.00 | 25.22  | mg/kg | 101% 75-125  |              |
| B180109-SRM2 | Standard Reference Material (1732010, CRM052-50G Loamy Clay 1)<br>As(WEN5) |        | 45.80 | 52.95  | mg/kg | 116% 75-125  |              |
| B180109-DUP2 | Duplicate, (1803009-13)<br>As(WEN5)  | 17.22  |       | 12.37  | mg/kg |              | 33% 25       |
| B180109-PS3  | Post Spike, (1803009-13)<br>As(WEN5)                                       | 17.22  | 14.27 | 30.35  | mg/kg | 92% 75-125   |              |
| B180109-PS4  | Post Spike, (1803009-13)<br>As(WEN5)                                       | 17.22  | 14.27 | 30.64  | mg/kg | 94% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180110  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte   | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|--------|--------|-------|--------------|--------------|
| B180110-BS1  | <b>Blank Spike, (1804032)</b>   |        |        |        |       |              |              |
|              | Al(WEN6)  |        | 500.0  | 436.5  | mg/kg | 87% 75-125   |              |
|              | Fe(WEN6)  |        | 500.0  | 444.1  | mg/kg | 89% 75-125   |              |
|              | Mn(WEN6)  |        | 50.00  | 46.42  | mg/kg | 93% 75-125   |              |
| B180110-SRM2 | <b>Standard Reference Material (NC00391, NIST 2702 Inorganics in Marine Sediment)</b>   |        |        |        |       |              |              |
|              | Al(WEN6)  |        | 84100  | 56800  | mg/kg | 68% 75-125   |              |
|              | Mn(WEN6)  |        | 1757   | 1561   | mg/kg | 89% 75-125   |              |
| B180110-SRM3 | <b>Standard Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)</b> |        |        |        |       |              |              |
|              | Al(WEN6)  |        | 132800 | 72950  | mg/kg | 55% 75-125   |              |
|              | Fe(WEN6)  |        | 104900 | 101200 | mg/kg | 96% 75-125   |              |
| B180110-SRM5 | <b>Standard Reference Material (NC00391, NIST 2702 Inorganics in Marine Sediment)</b>   |        |        |        |       |              |              |
|              | Fe(WEN6)  |        | 79100  | 70100  | mg/kg | 89% 75-125   |              |
| B180110-SRM6 | <b>Standard Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)</b> |        |        |        |       |              |              |
|              | Mn(WEN6)  |        | 240.2  | 211.1  | mg/kg | 88% 75-125   |              |
| B180110-DUP1 | <b>Duplicate, (1803009-10)</b>  |        |        |        |       |              |              |
|              | Al(WEN6)  | 28800  |        | 30220  | mg/kg |              | 5% 25        |
|              | Fe(WEN6)  | 27220  |        | 26100  | mg/kg |              | 4% 25        |
|              | Mn(WEN6)  | 534.1  |        | 507.4  | mg/kg |              | 5% 25        |
| B180110-PS1  | <b>Post Spike, (1803009-10)</b>   |        |        |        |       |              |              |
|              | Al(WEN6)  | 28800  | 1145   | 30030  | mg/kg | 108% 75-125  |              |
|              | Fe(WEN6)  | 27220  | 1145   | 28470  | mg/kg | 109% 75-125  |              |
|              | Mn(WEN6)  | 534.1  | 114.5  | 653.2  | mg/kg | 104% 75-125  |              |
| B180110-PS2  | <b>Post Spike, (1803009-10)</b>   |        |        |        |       |              |              |
|              | Al(WEN6)  | 28800  | 1145   | 30020  | mg/kg | 107% 75-125  |              |
|              | Fe(WEN6)  | 27220  | 1145   | 28560  | mg/kg | 117% 75-125  |              |
|              | Mn(WEN6)  | 534.1  | 114.5  | 645.4  | mg/kg | 97% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180110  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B180110-DUP2</b> | <b>Duplicate, (1803009-13)</b>  |        |       |        |       |              |              |
|                     | Al(WEN6)                        | 23900  |       | 30050  | mg/kg |              | 23% 25       |
|                     | Fe(WEN6)                        | 30520  |       | 29430  | mg/kg |              | 4% 25        |
|                     | Mn(WEN6)                        | 626.6  |       | 613.8  | mg/kg |              | 2% 25        |
| <b>B180110-PS3</b>  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|                     | Al(WEN6)                        | 23900  | 1142  | 25230  | mg/kg | 117% 75-125  |              |
|                     | Fe(WEN6)                        | 30520  | 1142  | 31990  | mg/kg | 129% 75-125  |              |
|                     | Mn(WEN6)                        | 626.6  | 114.2 | 740.0  | mg/kg | 99% 75-125   |              |
| <b>B180110-PS4</b>  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|                     | Al(WEN6)                        | 23900  | 1142  | 25210  | mg/kg | 115% 75-125  |              |
|                     | Fe(WEN6)                        | 30520  | 1142  | 32010  | mg/kg | 131% 75-125  |              |
|                     | Mn(WEN6)                        | 626.6  | 114.2 | 738.1  | mg/kg | 98% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1803009  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap

## Accuracy & Precision Summary

**Batch:** B180177  
**Lab Matrix:** Soil/Sediment  
**Method:** SM 2540G

| Sample       | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180177-DUP2 | Duplicate, (1803009-05)<br>%TS | 80.65  |       | 81.68  | %     |              | 1% 15        |
| B180177-DUP1 | Duplicate, (1803009-07)<br>%TS | 81.50  |       | 81.40  | %     |              | 0.1% 15      |



## Accuracy & Precision Summary

Batch: B180230  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte  | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|--------|--------|-------|--------------|--------------|
| B180230-BS2  | Blank Spike, (1639045)<br>Si(WEN6)   |        | 1000   | 980.6  | mg/kg | 98% 75-125   |              |
| B180230-SRM3 | Standard Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)<br>Si(WEN6) |        | 213000 | 200300 | mg/kg | 94% 75-125   |              |
| B180230-SRM6 | Standard Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)<br>Si(WEN6) |        | 213000 | 206700 | mg/kg | 97% 75-125   |              |
| B180230-DUP1 | Duplicate, (1803009-10)<br>Si(WEN6)  | 279700 |        | 260000 | mg/kg |              | 7% 25        |
| B180230-PS1  | Post Spike, (1803009-10)<br>Si(WEN6)   | 279700 | 11450  | 266000 | mg/kg | -119% 75-125 |              |
| B180230-PS2  | Post Spike, (1803009-10)<br>Si(WEN6)   | 279700 | 11450  | 268100 | mg/kg | -102% 75-125 |              |
| B180230-DUP2 | Duplicate, (1803009-13)<br>Si(WEN6)  | 256300 |        | 245600 | mg/kg |              | 4% 25        |
| B180230-PS3  | Post Spike, (1803009-13)<br>Si(WEN6)   | 256300 | 11420  | 260900 | mg/kg | 40% 75-125   |              |
| B180230-PS4  | Post Spike, (1803009-13)<br>Si(WEN6)   | 256300 | 11420  | 259400 | mg/kg | 27% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180269  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180269-DUP1 | <b>Duplicate, (1803009-10)</b>  |        |       |        |       |              |              |
|              | Al(WEN2)                        | 0.620  |       | 0.472  | mg/kg |              | 27% 25       |
|              | Si(WEN2)                        | 380.2  |       | 397.8  | mg/kg |              | 5% 25        |
| B180269-PS1  | <b>Post Spike, (1803009-10)</b> |        |       |        |       |              |              |
|              | Al(WEN2)                        | 0.620  | 71.57 | 73.74  | mg/kg | 102% 75-125  |              |
|              | Si(WEN2)                        | 380.2  | 715.7 | 1145   | mg/kg | 107% 75-125  |              |
| B180269-PS2  | <b>Post Spike, (1803009-10)</b> |        |       |        |       |              |              |
|              | Al(WEN2)                        | 0.620  | 71.57 | 73.08  | mg/kg | 101% 75-125  |              |
|              | Si(WEN2)                        | 380.2  | 715.7 | 1129   | mg/kg | 105% 75-125  |              |
| B180269-DUP2 | <b>Duplicate, (1803009-13)</b>  |        |       |        |       |              |              |
|              | Al(WEN2)                        | 2.289  |       | 1.986  | mg/kg |              | 14% 25       |
|              | Si(WEN2)                        | 190.1  |       | 218.7  | mg/kg |              | 14% 25       |
| B180269-PS3  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|              | Al(WEN2)                        | 2.289  | 71.36 | 73.41  | mg/kg | 100% 75-125  |              |
|              | Si(WEN2)                        | 190.1  | 713.6 | 941.4  | mg/kg | 105% 75-125  |              |
| B180269-PS4  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|              | Al(WEN2)                        | 2.289  | 71.36 | 74.10  | mg/kg | 101% 75-125  |              |
|              | Si(WEN2)                        | 190.1  | 713.6 | 941.2  | mg/kg | 105% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180270  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180270-DUP1 | Duplicate, (1803009-10)<br>As(WEN3)  | 8.334  |       | 9.547  | mg/kg |              | 14% 25       |
| B180270-PS1  | Post Spike, (1803009-10)<br>As(WEN3) | 8.334  | 7.157 | 15.46  | mg/kg | 100% 75-125  |              |
| B180270-PS2  | Post Spike, (1803009-10)<br>As(WEN3) | 8.334  | 7.157 | 15.94  | mg/kg | 106% 75-125  |              |
| B180270-DUP2 | Duplicate, (1803009-13)<br>As(WEN3)  | 401.6  |       | 306.7  | mg/kg |              | 27% 25       |
| B180270-PS3  | Post Spike, (1803009-13)<br>As(WEN3) | 401.6  | 142.7 | 534.0  | mg/kg | 93% 75-125   |              |
| B180270-PS4  | Post Spike, (1803009-13)<br>As(WEN3) | 401.6  | 142.7 | 544.2  | mg/kg | 100% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180272  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---|--------|-------|--------|-------|--------------|--------------|
| <b>B180272-BS1</b>  | <b>Blank Spike, (1804031)</b>   |        |       |        |       |              |              |
|                     | Al(WEN5)  |        | 250.0 | 244.2  | mg/kg | 98% 75-125   |              |
|                     | As(WEN5)  |        | 25.00 | 27.46  | mg/kg | 110% 75-125  |              |
|                     | Fe(WEN5)  |        | 250.0 | 258.4  | mg/kg | 103% 75-125  |              |
|                     | Mn(WEN5)  |        | 25.00 | 27.33  | mg/kg | 109% 75-125  |              |
| <b>B180272-SRM2</b> | <b>Standard Reference Material (1732010, CRM052-50G Loamy Clay 1)</b> |        |       |        |       |              |              |
|                     | Al(WEN5)  |        | 11500 | 10750  | mg/kg | 93% 75-125   |              |
|                     | As(WEN5)  |        | 45.80 | 62.06  | mg/kg | 135% 75-125  |              |
|                     | Fe(WEN5)  |        | 5090  | 5700   | mg/kg | 112% 75-125  |              |
|                     | Mn(WEN5)  |        | 552.0 | 638.2  | mg/kg | 116% 75-200  |              |
|                     | Si(WEN5)  |        | 795.0 | 734.3  | mg/kg | 92% 75-125   |              |
| <b>B180272-DUP1</b> | <b>Duplicate, (1803009-10)</b>  |        |       |        |       |              |              |
|                     | Al(WEN5)  | 4600   |       | 4573   | mg/kg |              | 0.6% 25      |
|                     | As(WEN5)  | 64.42  |       | 56.37  | mg/kg |              | 13% 25       |
|                     | Fe(WEN5)  | 9886   |       | 9643   | mg/kg |              | 2% 25        |
|                     | Mn(WEN5)  | 99.43  |       | 96.19  | mg/kg |              | 3% 25        |
|                     | Si(WEN5)  | 195.4  |       | 206.0  | mg/kg |              | 5% 25        |
| <b>B180272-PS1</b>  | <b>Post Spike, (1803009-10)</b>                                       |        |       |        |       |              |              |
|                     | Al(WEN5)  | 4600   | 143.1 | 4662   | mg/kg | 43% 75-125   |              |
|                     | As(WEN5)  | 64.42  | 14.31 | 78.24  | mg/kg | 97% 75-125   |              |
|                     | Fe(WEN5)  | 9886   | 143.1 | 9818   | mg/kg | -48% 75-125  |              |
|                     | Mn(WEN5)  | 99.43  | 14.31 | 113.2  | mg/kg | 96% 75-125   |              |
|                     | Si(WEN5)  | 195.4  | 1431  | 1658   | mg/kg | 102% 75-125  |              |
| <b>B180272-PS2</b>  | <b>Post Spike, (1803009-10)</b>                                       |        |       |        |       |              |              |
|                     | Al(WEN5)  | 4600   | 143.1 | 4708   | mg/kg | 75% 75-125   |              |
|                     | As(WEN5)  | 64.42  | 14.31 | 79.71  | mg/kg | 107% 75-125  |              |
|                     | Fe(WEN5)  | 9886   | 143.1 | 9801   | mg/kg | -59% 75-125  |              |
|                     | Mn(WEN5)  | 99.43  | 14.31 | 114.3  | mg/kg | 104% 75-125  |              |
|                     | Si(WEN5)  | 195.4  | 1431  | 1685   | mg/kg | 104% 75-125  |              |





## Accuracy & Precision Summary

Batch: B180272  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B180272-DUP2</b> | <b>Duplicate, (1803009-13)</b>  |        |       |        |       |              |              |
|                     | Al(WEN5)                        | 4418   |       | 4086   | mg/kg |              | 8% 25        |
|                     | Fe(WEN5)                        | 6125   |       | 5178   | mg/kg |              | 17% 25       |
|                     | Mn(WEN5)                        | 56.83  |       | 48.21  | mg/kg |              | 16% 25       |
|                     | Si(WEN5)                        | 161.9  |       | 204.0  | mg/kg |              | 23% 25       |
| <b>B180272-PS3</b>  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|                     | Al(WEN5)                        | 4418   | 142.7 | 4624   | mg/kg | 145% 75-125  |              |
|                     | Fe(WEN5)                        | 6125   | 142.7 | 6329   | mg/kg | 143% 75-125  |              |
|                     | Mn(WEN5)                        | 56.83  | 14.27 | 72.91  | mg/kg | 113% 75-125  |              |
|                     | Si(WEN5)                        | 161.9  | 1427  | 1701   | mg/kg | 108% 75-125  |              |
| <b>B180272-PS4</b>  | <b>Post Spike, (1803009-13)</b> |        |       |        |       |              |              |
|                     | Al(WEN5)                        | 4418   | 142.7 | 4621   | mg/kg | 143% 75-125  |              |
|                     | Fe(WEN5)                        | 6125   | 142.7 | 6284   | mg/kg | 111% 75-125  |              |
|                     | Mn(WEN5)                        | 56.83  | 14.27 | 72.70  | mg/kg | 111% 75-125  |              |
|                     | Si(WEN5)                        | 161.9  | 1427  | 1689   | mg/kg | 107% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180273  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B180273-BS1  | <b>Blank Spike, (1804032)</b><br>As(WEN6)   |        | 50.00 | 51.96  | mg/kg | 104% 75-125  |              |
| B180273-SRM2 | <b>Standard Reference Material (NC00391, NIST 2702 Inorganics in Marine Sediment)</b><br>As(WEN6)   |        | 45.30 | 44.51  | mg/kg | 98% 75-125   |              |
| B180273-SRM3 | <b>Standard Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)</b><br>As(WEN6) |        | 186.2 | 180.3  | mg/kg | 97% 75-125   |              |
| B180273-DUP1 | <b>Duplicate, (1803009-10)</b><br>As(WEN6)  | 3.616  |       | 3.631  | mg/kg |              | 0.4% 25      |
| B180273-PS1  | <b>Post Spike, (1803009-10)</b><br>As(WEN6)   | 3.616  | 114.5 | 117.5  | mg/kg | 99% 75-125   |              |
| B180273-PS2  | <b>Post Spike, (1803009-10)</b><br>As(WEN6)   | 3.616  | 114.5 | 115.8  | mg/kg | 98% 75-125   |              |
| B180273-DUP2 | <b>Duplicate, (1803009-13)</b><br>As(WEN6)  | 3.585  |       | 3.375  | mg/kg |              | 6% 25        |
| B180273-PS3  | <b>Post Spike, (1803009-13)</b><br>As(WEN6)   | 3.585  | 114.2 | 115.7  | mg/kg | 98% 75-125   |              |
| B180273-PS4  | <b>Post Spike, (1803009-13)</b><br>As(WEN6)   | 3.585  | 114.2 | 115.6  | mg/kg | 98% 75-125   |              |



## Method Blanks & Reporting Limits

**Batch:** B180106  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN2)

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B180106-BLK1    | -0.003        | mg/kg |                   |
| B180106-BLK2    | -0.004        | mg/kg |                   |
| B180106-BLK3    | 0.001         | mg/kg |                   |
| B180106-BLK4    | -0.006        | mg/kg |                   |
| <b>Average:</b> | <b>-0.003</b> |       | <b>MDL: 0.012</b> |
| <b>Limit:</b>   | <b>0.025</b>  |       | <b>MRL: 0.025</b> |

**Analyte:** Fe(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180106-BLK1    | 0.081        | mg/kg |                   |
| B180106-BLK2    | 0.234        | mg/kg |                   |
| B180106-BLK4    | 0.076        | mg/kg |                   |
| <b>Average:</b> | <b>0.130</b> |       | <b>MDL: 0.400</b> |
| <b>Limit:</b>   | <b>0.800</b> |       | <b>MRL: 0.800</b> |

**Analyte:** Mn(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180106-BLK1    | 0.0003       | mg/kg |                   |
| B180106-BLK2    | 0.004        | mg/kg |                   |
| B180106-BLK3    | 0.004        | mg/kg |                   |
| B180106-BLK4    | 0.001        | mg/kg |                   |
| <b>Average:</b> | <b>0.002</b> |       | <b>MDL: 0.008</b> |
| <b>Limit:</b>   | <b>0.016</b> |       | <b>MRL: 0.025</b> |



## Method Blanks & Reporting Limits

**Batch:** B180107  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180107-BLK1    | 0.056        | mg/kg |                   |
| B180107-BLK2    | 0.079        | mg/kg |                   |
| B180107-BLK3    | 0.041        | mg/kg |                   |
| B180107-BLK4    | 0.021        | mg/kg |                   |
| <b>Average:</b> | <b>0.049</b> |       | <b>MDL: 0.125</b> |
| <b>Limit:</b>   | <b>0.250</b> |       | <b>MRL: 0.250</b> |

**Analyte:** Fe(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180107-BLK1    | 0.630        | mg/kg |                   |
| B180107-BLK2    | 0.472        | mg/kg |                   |
| B180107-BLK3    | 0.640        | mg/kg |                   |
| B180107-BLK4    | 0.477        | mg/kg |                   |
| <b>Average:</b> | <b>0.555</b> |       | <b>MDL: 0.850</b> |
| <b>Limit:</b>   | <b>1.700</b> |       | <b>MRL: 1.70</b>  |

**Analyte:** Mn(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180107-BLK1    | 0.126        | mg/kg |                   |
| B180107-BLK2    | 0.131        | mg/kg |                   |
| B180107-BLK3    | 0.133        | mg/kg |                   |
| B180107-BLK4    | 0.122        | mg/kg |                   |
| <b>Average:</b> | <b>0.128</b> |       | <b>MDL: 0.150</b> |
| <b>Limit:</b>   | <b>0.300</b> |       | <b>MRL: 0.300</b> |



## Method Blanks & Reporting Limits

**Analyte:** Si(WEN3)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B180107-BLK1    | 0.122         | mg/kg        |                  |
| B180107-BLK2    | -0.501        | mg/kg        |                  |
| B180107-BLK3    | 0.278         | mg/kg        |                  |
| B180107-BLK4    | -0.437        | mg/kg        |                  |
| <b>Average:</b> | <b>-0.134</b> |              | <b>MDL: 1.30</b> |
| <b>Limit:</b>   | <b>2.600</b>  |              | <b>MRL: 2.75</b> |



## Method Blanks & Reporting Limits

**Batch:** B180108  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180108-BLK1    | 0.058        | mg/kg |                   |
| B180108-BLK2    | 0.013        | mg/kg |                   |
| B180108-BLK3    | 0.097        | mg/kg |                   |
| B180108-BLK4    | 0.026        | mg/kg |                   |
| <b>Average:</b> | <b>0.048</b> |       | <b>MDL: 0.162</b> |
| <b>Limit:</b>   | <b>0.325</b> |       | <b>MRL: 0.325</b> |

**Analyte:** As(WEN4)

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B180108-BLK1    | 0.030        | mg/kg |                  |
| B180108-BLK2    | 0.277        | mg/kg |                  |
| B180108-BLK3    | 0.499        | mg/kg |                  |
| B180108-BLK4    | 0.544        | mg/kg |                  |
| <b>Average:</b> | <b>0.338</b> |       | <b>MDL: 1.05</b> |
| <b>Limit:</b>   | <b>2.100</b> |       | <b>MRL: 2.10</b> |

**Analyte:** Fe(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180108-BLK1    | 0.604        | mg/kg |                   |
| B180108-BLK2    | 0.474        | mg/kg |                   |
| B180108-BLK3    | 0.516        | mg/kg |                   |
| B180108-BLK4    | 0.467        | mg/kg |                   |
| <b>Average:</b> | <b>0.515</b> |       | <b>MDL: 0.700</b> |
| <b>Limit:</b>   | <b>1.400</b> |       | <b>MRL: 1.40</b>  |



## Method Blanks & Reporting Limits

**Analyte:** Mn(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180108-BLK1    | 0.119        | mg/kg |                   |
| B180108-BLK2    | 0.123        | mg/kg |                   |
| B180108-BLK3    | 0.117        | mg/kg |                   |
| B180108-BLK4    | 0.112        | mg/kg |                   |
| <b>Average:</b> | <b>0.118</b> |       | <b>MDL: 0.130</b> |
| <b>Limit:</b>   | <b>0.260</b> |       | <b>MRL: 0.275</b> |

**Analyte:** Si(WEN4)

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B180108-BLK1    | -1.12         | mg/kg |                  |
| B180108-BLK2    | -1.13         | mg/kg |                  |
| B180108-BLK3    | -1.40         | mg/kg |                  |
| B180108-BLK4    | -0.910        | mg/kg |                  |
| <b>Average:</b> | <b>-1.140</b> |       | <b>MDL: 1.75</b> |
| <b>Limit:</b>   | <b>3.500</b>  |       | <b>MRL: 3.50</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1803009  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap

## Method Blanks & Reporting Limits

**Batch:** B180109  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN5)

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B180109-BLK1    | 1.30   | mg/kg |                  |
| B180109-BLK2    | 1.30   | mg/kg |                  |
| B180109-BLK3    | 1.31   | mg/kg |                  |
| B180109-BLK4    | 1.20   | mg/kg |                  |
| <b>Average:</b> | 1.278  |       | <b>MDL:</b> 1.45 |
| <b>Limit:</b>   | 2.900  |       | <b>MRL:</b> 2.90 |





## Method Blanks & Reporting Limits

**Batch:** B180110  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN6)

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B180110-BLK1    | 1.14         | mg/kg |                  |
| B180110-BLK2    | 0.625        | mg/kg |                  |
| B180110-BLK3    | -0.303       | mg/kg |                  |
| B180110-BLK4    | 0.667        | mg/kg |                  |
| <b>Average:</b> | <b>0.532</b> |       | <b>MDL: 2.40</b> |
| <b>Limit:</b>   | <b>4.800</b> |       | <b>MRL: 4.80</b> |

**Analyte:** Fe(WEN6)

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B180110-BLK1    | 1.20         | mg/kg |                  |
| B180110-BLK2    | 0.280        | mg/kg |                  |
| B180110-BLK3    | 0.076        | mg/kg |                  |
| B180110-BLK4    | 0.633        | mg/kg |                  |
| <b>Average:</b> | <b>0.548</b> |       | <b>MDL: 2.10</b> |
| <b>Limit:</b>   | <b>4.200</b> |       | <b>MRL: 4.20</b> |

**Analyte:** Mn(WEN6)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180110-BLK1    | 0.030        | mg/kg |                   |
| B180110-BLK2    | -0.001       | mg/kg |                   |
| B180110-BLK3    | 0.018        | mg/kg |                   |
| B180110-BLK4    | -0.016       | mg/kg |                   |
| <b>Average:</b> | <b>0.008</b> |       | <b>MDL: 0.069</b> |
| <b>Limit:</b>   | <b>0.138</b> |       | <b>MRL: 0.400</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1803009  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap

## Method Blanks & Reporting Limits

**Batch:** B180177  
**Matrix:** Soil/Sediment  
**Method:** SM 2540G  
**Analyte:** %TS

| Sample       | Result | Units |
|--------------|--------|-------|
| B180177-BLK1 | -0.02  | %     |
| B180177-BLK2 | -0.02  | %     |

**Average:** -0.02  
**Limit:** 0.01

**MDL:** 0.004  
**MRL:** 0.01

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1803009  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap

## Method Blanks & Reporting Limits

**Batch:** B180230  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Si(WEN6)

| Sample       | Result | Units |
|--------------|--------|-------|
| B180230-BLK1 | -139   | mg/kg |
| B180230-BLK2 | -261   | mg/kg |
| B180230-BLK3 | -138   | mg/kg |
| B180230-BLK4 | -153   | mg/kg |

**Average:** -172.700  
**Limit:** 700.000

**MDL:** 350  
**MRL:** 700



## Method Blanks & Reporting Limits

**Batch:** B180269  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180269-BLK1    | 0.056        | mg/kg |                   |
| B180269-BLK2    | 0.063        | mg/kg |                   |
| B180269-BLK3    | 0.046        | mg/kg |                   |
| B180269-BLK4    | 0.055        | mg/kg |                   |
| <b>Average:</b> | <b>0.055</b> |       | <b>MDL: 0.075</b> |
| <b>Limit:</b>   | <b>0.150</b> |       | <b>MRL: 0.250</b> |

**Analyte:** Si(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180269-BLK1    | 0.122        | mg/kg |                   |
| B180269-BLK2    | 0.207        | mg/kg |                   |
| B180269-BLK3    | 0.263        | mg/kg |                   |
| B180269-BLK4    | 0.205        | mg/kg |                   |
| <b>Average:</b> | <b>0.199</b> |       | <b>MDL: 0.375</b> |
| <b>Limit:</b>   | <b>0.750</b> |       | <b>MRL: 2.50</b>  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1803009  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap

## Method Blanks & Reporting Limits

**Batch:** B180270  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN3)

| Sample       | Result | Units |
|--------------|--------|-------|
| B180270-BLK1 | 0.055  | mg/kg |
| B180270-BLK2 | 0.056  | mg/kg |
| B180270-BLK3 | 0.084  | mg/kg |
| B180270-BLK4 | 0.075  | mg/kg |

**Average:** 0.068  
**Limit:** 0.220

**MDL:** 0.110  
**MRL:** 0.220



## Method Blanks & Reporting Limits

**Batch:** B180272  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN5)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180272-BLK1    | 0.353        | mg/kg |                   |
| B180272-BLK2    | 0.132        | mg/kg |                   |
| B180272-BLK3    | 0.125        | mg/kg |                   |
| B180272-BLK4    | 0.066        | mg/kg |                   |
| <b>Average:</b> | <b>0.169</b> |       | <b>MDL: 0.550</b> |
| <b>Limit:</b>   | <b>1.100</b> |       | <b>MRL: 1.10</b>  |

**Analyte:** As(WEN5)

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B180272-BLK1    | 2.82         | mg/kg |                  |
| B180272-BLK2    | 2.46         | mg/kg |                  |
| B180272-BLK3    | 2.74         | mg/kg |                  |
| B180272-BLK4    | 2.77         | mg/kg |                  |
| <b>Average:</b> | <b>2.699</b> |       | <b>MDL: 3.25</b> |
| <b>Limit:</b>   | <b>6.500</b> |       | <b>MRL: 6.50</b> |

**Analyte:** Fe(WEN5)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B180272-BLK1    | 0.548        | mg/kg |                   |
| B180272-BLK2    | 0.083        | mg/kg |                   |
| B180272-BLK3    | 0.099        | mg/kg |                   |
| B180272-BLK4    | 0.174        | mg/kg |                   |
| <b>Average:</b> | <b>0.226</b> |       | <b>MDL: 0.875</b> |
| <b>Limit:</b>   | <b>1.750</b> |       | <b>MRL: 1.75</b>  |



## Method Blanks & Reporting Limits

**Analyte:** Mn(WEN5)

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B180272-BLK1    | -0.002        | mg/kg |                   |
| B180272-BLK2    | -0.004        | mg/kg |                   |
| B180272-BLK3    | -0.003        | mg/kg |                   |
| B180272-BLK4    | -0.004        | mg/kg |                   |
| <b>Average:</b> | <b>-0.003</b> |       | <b>MDL: 0.006</b> |
| <b>Limit:</b>   | <b>0.013</b>  |       | <b>MRL: 0.050</b> |

**Analyte:** Si(WEN5)

| Sample          | Result        | Units |                   |
|-----------------|---------------|-------|-------------------|
| B180272-BLK1    | -0.101        | mg/kg |                   |
| B180272-BLK2    | -0.472        | mg/kg |                   |
| B180272-BLK3    | -0.070        | mg/kg |                   |
| B180272-BLK4    | -0.192        | mg/kg |                   |
| <b>Average:</b> | <b>-0.209</b> |       | <b>MDL: 0.750</b> |
| <b>Limit:</b>   | <b>1.500</b>  |       | <b>MRL: 5.00</b>  |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1803009  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap

## Method Blanks & Reporting Limits

**Batch:** B180273  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN6)

| Sample       | Result | Units |
|--------------|--------|-------|
| B180273-BLK1 | 1.43   | mg/kg |
| B180273-BLK2 | 1.72   | mg/kg |
| B180273-BLK3 | 1.47   | mg/kg |
| B180273-BLK4 | 1.34   | mg/kg |

**Average:** 1.488  
**Limit:** 4.000

**MDL:** 2.00  
**MRL:** 4.00





## Sample Containers

|  |                    |                       |   |                     |   |
|--|--------------------|-----------------------|---|---------------------|---|
| <b>Lab ID:</b> 1803009-01<br><b>Sample:</b> SO-PTC-208-091317-12.0-14.0<br><b>Des Container</b><br>A Client-Provided | <b>Size</b><br>8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/13/2017<br><b>Received:</b> 09/14/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler -<br>1803009   |
| <b>Lab ID:</b> 1803009-02<br><b>Sample:</b> SO-PTC-208-091317-23.0-25.0<br><b>Des Container</b><br>A Client-Provided | <b>Size</b><br>8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/13/2017<br><b>Received:</b> 09/14/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler -<br>1803009   |
| <b>Lab ID:</b> 1803009-03<br><b>Sample:</b> SO-PTC-101-091417-8.2-10.2<br><b>Des Container</b><br>A Client-Provided  | <b>Size</b><br>8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/14/2017<br><b>Received:</b> 09/15/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler 2 -<br>1803009 |
| <b>Lab ID:</b> 1803009-04<br><b>Sample:</b> SO-PTC-101-091417-19.3-20.3<br><b>Des Container</b><br>A Client-Provided | <b>Size</b><br>8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/14/2017<br><b>Received:</b> 09/15/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler 2 -<br>1803009 |
| <b>Lab ID:</b> 1803009-05<br><b>Sample:</b> SO-PTC-121-091817-11.0-13.0<br><b>Des Container</b><br>A Client-Provided | <b>Size</b><br>8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/18/2017<br><b>Received:</b> 09/18/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler 3 -<br>1803009 |
| <b>Lab ID:</b> 1803009-06<br><b>Sample:</b> SO-PTC-121-091817-22.0-24.0<br><b>Des Container</b><br>A Client-Provided | <b>Size</b><br>8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/18/2017<br><b>Received:</b> 09/18/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler 3 -<br>1803009 |

Project ID: PTC-OA1701  
PM: Jeremy Maute



BAL Report 1803009  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap

## Sample Containers

|  |                       |   |                     |  |
|--|-----------------------|---|---------------------|--|
| <b>Lab ID:</b> 1803009-07<br><b>Sample:</b> SO-PTC-111-091817-6.0-8.0<br><b>Des Container</b> <b>Size</b><br>A    Client-Provided                      8oz   | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/18/2017<br><b>Received:</b> 09/19/2017<br><b>pH</b> <b>Ship. Cont.</b><br>Cooler 4 -<br>1803009 |
| <b>Lab ID:</b> 1803009-08<br><b>Sample:</b> SO-PTC-111-091817-20.0-22.0<br><b>Des Container</b> <b>Size</b><br>A    Client-Provided                      8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/18/2017<br><b>Received:</b> 09/19/2017<br><b>pH</b> <b>Ship. Cont.</b><br>Cooler 4 -<br>1803009 |
| <b>Lab ID:</b> 1803009-09<br><b>Sample:</b> SO-PTC-204-091917-10.8-12.8<br><b>Des Container</b> <b>Size</b><br>A    Client-Provided                      8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/19/2017<br><b>Received:</b> 09/19/2017<br><b>pH</b> <b>Ship. Cont.</b><br>Cooler 5 -<br>1803009 |
| <b>Lab ID:</b> 1803009-10<br><b>Sample:</b> SO-PTC-204-091917-23.0-25.0<br><b>Des Container</b> <b>Size</b><br>A    Client-Provided                      8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/19/2017<br><b>Received:</b> 09/19/2017<br><b>pH</b> <b>Ship. Cont.</b><br>Cooler 5 -<br>1803009 |
| <b>Lab ID:</b> 1803009-11<br><b>Sample:</b> SO-PTC-113-092017-7.5-10.0<br><b>Des Container</b> <b>Size</b><br>A    Client-Provided                      8oz  | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/20/2017<br><b>Received:</b> 09/20/2017<br><b>pH</b> <b>Ship. Cont.</b><br>Cooler 6 -<br>1803009 |
| <b>Lab ID:</b> 1803009-12<br><b>Sample:</b> SO-PTC-113-092017-18.0-20.0<br><b>Des Container</b> <b>Size</b><br>A    Client-Provided                      8oz | <b>Lot</b><br>17-0058 | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/20/2017<br><b>Received:</b> 09/20/2017<br><b>pH</b> <b>Ship. Cont.</b><br>Cooler 6 -<br>1803009 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1803009  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap

## Sample Containers

|  |                  |             |                            |                     |              |                              |                       |
|--|------------------|-------------|----------------------------|---------------------|--------------|------------------------------|-----------------------|
| <b>Lab ID:</b> 1803009-13                  |                  |             | <b>Report Matrix:</b> Soil |                     |              | <b>Collected:</b> 09/20/2017 |                       |
| <b>Sample:</b> SO-PTC-129-092017-10.0-12.0 |                  |             | <b>Sample Type:</b> Sample |                     |              | <b>Received:</b> 09/21/2017  |                       |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b> | <b>Lot</b>                 | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>    |
| A  | Client-Provided  | 8oz         | 17-0058                    | none                | n/a          |                              | Cooler 7 -<br>1803009 |
|  |                  |             |                            |                     |              |                              |                       |
| <b>Lab ID:</b> 1803009-14                  |                  |             | <b>Report Matrix:</b> Soil |                     |              | <b>Collected:</b> 09/20/2017 |                       |
| <b>Sample:</b> SO-PTC-129-092017-22.5-25.0 |                  |             | <b>Sample Type:</b> Sample |                     |              | <b>Received:</b> 09/21/2017  |                       |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b> | <b>Lot</b>                 | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>    |
| A  | Client-Provided  | 8oz         | 17-0058                    | none                | n/a          |                              | Cooler 7 -<br>1803009 |



## Shipping Containers

### Cooler - 1803009

Received: September 14, 2017 15:30  
Tracking No: none via Courier  
Coolant Type: Dry Ice  
Temperature: -11.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 2 - 1803009

Received: September 15, 2017 16:30  
Tracking No: none via Courier  
Coolant Type: Dry Ice  
Temperature: -11.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? Yes  
Custody seals intact? Yes  
COC present? Yes

### Cooler 3 - 1803009

Received: September 18, 2017 15:00  
Tracking No: none via Courier  
Coolant Type: Dry Ice  
Temperature: -1.5 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? Yes  
Custody seals intact? Yes  
COC present? Yes

### Cooler 4 - 1803009

Received: September 19, 2017 15:45  
Tracking No: none via Courier  
Coolant Type: Dry Ice  
Temperature: -15.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #15

Custody seals present? Yes  
Custody seals intact? Yes  
COC present? Yes

### Cooler 5 - 1803009

Received: September 19, 2017 15:45  
Tracking No: none via Courier  
Coolant Type: Dry Ice  
Temperature: -5.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #15

Custody seals present? Yes  
Custody seals intact? Yes  
COC present? Yes

### Cooler 6 - 1803009

Received: September 20, 2017 15:40  
Tracking No: none via Courier  
Coolant Type: Dry Ice  
Temperature: 1.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? Yes  
Custody seals intact? Yes  
COC present? Yes

### Cooler 7 - 1803009

Received: September 21, 2017 9:10  
Tracking No: none via Courier  
Coolant Type: Dry Ice  
Temperature: -19.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? No  
Custody seals intact? No  
COC present? Yes



# Chain-of-Custody Form

BAL Report 1803009

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: [Signature] For BAL use only Date: 9/14/17  
Work Order ID: 1737059 Time: 1530

Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_

Email Receipt Confirmation? Yes  
BAL PM: **Jeremy Maute**

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

| Requested TAT (business days)  | Collection                              |                      | Client Sample Info |                      |                 |                                    | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|----------------------|--------------------|----------------------|-----------------|------------------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type                  | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          | Specify Here                         |
| 1  | 50-PTC-209-091317-17.0-14.0             | 9/13/17              | 1350               | SDIC                 | 1               |                                    |  | X   | X   |   |   |   |  |          |                                      |
| 2  | 50-PTC-208-091317-23.0-25.0             | 9/13/17              | 1420               | SDIC                 | 1               |                                    |  | X   | X   |   |   |   |  |          |                                      |
| 3  |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 4  |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 5  |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 6  |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 7  |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 8  |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 9  |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 10   |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Steve Frost</u>  |   | Date: <u>9-14-17</u> |                    | Time: <u>2:05 pm</u> |                 | Relinquished By: _____             |  |   |   | Date: _____   |   | Time: _____   |  |          |                                      |
| Received By: <u>Zaed Starba</u>  |   | Date: <u>9-14-17</u> |                    | Time: <u>2:05 pm</u> |                 | Total Number of Packages: <u>1</u> |  |   |   |   |   |   |  |          |                                      |

**Print**



# Chain-of-Custody Form

BAL Report 1803009

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466 / *dgcooper*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Lauren Miller* For BAL use only Date: 9/15/17  
 Work Order ID: \_\_\_\_\_ Time: 1630  
 Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_  
18804 North Creek Parkway, Suite 100, Bothell, WA 98011-3127

Email Receipt Confirmation? Yes  
 BAL PM: **Jeremy Maute**

| Requested TAT (business days)  | Collection                              |                    | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |              |
|--|---|--------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|--------------|
|  | Date                                    | Time               | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID                               |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 1  | J0-PTC-101-091417-8.2-10.2              | 9/14/17            | 1350                            | SOIL                 | 1               |                   | X  | X   |   |   |   |   |  |          |                                      | Specify Here |
| 2  | J0-PTC-101-091417-19.3-20.3             | 9/14/17            | 1405                            | SOIL                 | 1               |                   | X  | X   |   |   |   |   |  |          |                                      |              |
| 3  | J0-PTC-001-091517-2.5-4.5               | 9/15/17            | 11:50                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 4  | J0-PTC-001-091517-11.5-13.5             | 9/15/17            | 12:00                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 5  | J0-PTC-001-091517-23.0-25.0             | 9/15/17            | 12:20                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 6  | J0-PTC-001-091517-31.5-33.5             | 9/15/17            | 11:20                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 7  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 8  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 9  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 10   |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | Trip Blank (specify)                    |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| Relinquished By: <i>Lauren Miller</i>  | Date: <del>9/14/17</del> <u>9/15/17</u> | Time: <u>12:35</u> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |                                      |              |
| Received By: <i>Armando Amato</i>  | Date: <u>9.15.17</u>                    | Time: <u>12:35</u> | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |

Page 1 of 1

List Hazardous Contaminants: \_\_\_\_\_

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# Chain-of-Custody Form

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: [Signature] For BAL use only Date: 9/18/17

Work Order ID: \_\_\_\_\_ Time: 15:00

Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection           |                             | Client Sample Info |                      |                 |                   | BRL Analyses Required   |  |  |  |  |  |   | Comments |                                     |              |
|--|----------------------|-----------------------------|--------------------|----------------------|-----------------|-------------------|---|--|--|--|--|--|---|----------|-------------------------------------|--------------|
|  | Date                 | Time                        | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type | Solid Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid Total recoverable As by 6020 for each sequential extraction sample | Solid Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note Field conductivity measurement |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID            |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | 1                    | SO-PTC-121-091817-11.0-13.0 | 9/18/17            | 11:50                | SOIL            | 1                 |   |  |  |  |  |  |   |          |                                     | Specify Here |
|  | 2                    | SO-PTC-121-091817-22.0-24.0 | 9/18/17            | 12:00                | SOIL            | 1                 |   |  |  |  |  |  |   |          |                                     |              |
|  | 3                    |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | 4                    |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | 5                    |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | 6                    |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | 7                    |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | 8                    |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | 9                    |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | 10                   |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |
|  | Trip Blank (specify) |                             |                    |                      |                 |                   |   |  |  |  |  |  |   |          |                                     |              |

Relinquished By: [Signature] Date: 9/18/17 Time: 13:10 Relinquished By: [Signature] Date: 9-18 Time: 13:10

Received By: [Signature] Date: 9-18-17 Time: 13:10 Total Number of Packages: \_\_\_\_\_

**Print**



# Chain-of-Custody Form

BAL Report 1803009

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Lauren [Signature] For BAL use only Date: 9/19/17

Work Order ID: \_\_\_\_\_ Time: 15:45

Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: Troy Bussey (PIONEER)  
 Port of Tacoma 5203 Corporate Center Ct SE 5th A  
 PO Box 1857 Tacoma, WA 98401-1857 Olympia, WA 98503

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)   | Collection                 |                      | Client Sample Info |                      |                 |                                    | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|----------------------------|----------------------|--------------------|----------------------|-----------------|------------------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                       | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type                  | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-6 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID                  |                      |                    |                      |                 |                                    |  |   |   |   |   |   | Specify Here   |          |                                      |
| 1   | 50-PTC-111-091817-60-8.0   | 9/18/17              | 1500               | SOIL                 | 1               |                                    | X  | X   |   |   |   |   |  |          |                                      |
| 2   | 50-PTC-111-091817-200-220  | 9/18/17              | 1510               | SOIL                 | 1               |                                    | X  | X   |   |   |   |   |  |          |                                      |
| 3   | 50-PTC-204-091917-10.3-128 | 9/19/17              | 11:00              | SOIL                 | 1               |                                    | X  | X   |   |   |   |   |  |          |                                      |
| 4   | 50-PTC-204-091917-220-250  | 9/19/17              | 10:15              | SOIL                 | 1               |                                    | X  | X   |   |   |   |   |  |          |                                      |
| 5   |                            |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 6   |                            |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 7   |                            |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 8   |                            |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 9   |                            |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| 10  |                            |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)  |                            |                      |                    |                      |                 |                                    |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>[Signature]</u>   |                            | Date: <u>9/19/17</u> |                    | Time: <u>1300</u>    |                 | Relinquished By: _____             |  |   | Date: _____   |   | Time: _____   |   |  |          |                                      |
| Received By: <u>[Signature]</u>   |                            | Date: <u>9-19-17</u> |                    | Time: <u>1300</u>    |                 | Total Number of Packages: <u>2</u> |  |   |   |   |   |   |  |          |                                      |

Page \_\_\_\_ of \_\_\_\_ List Hazardous Contaminants: \_\_\_\_\_

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# Chain-of-Custody Form

BAL Report 1803009

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466 / C. Keme  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: James Miller For BRL use only Date: 9/20/17  
 Work Order ID: \_\_\_\_\_ Time: 15:40  
 Project ID: \_\_\_\_\_

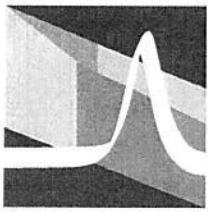
Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |                      | Client Sample Info |                      |                 |                                 | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|----------------------|--------------------|----------------------|-----------------|---------------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type               | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          | Specify Here                         |
| 1  | SD-PTC-13-092017-7.5-10.0               | 9/20/17              | 10:20              | SOIL                 |                 |                                 | X  | X   |   |   |   |   |  |          |                                      |
| 2  | SD-PTC-13-092017-18.0-20.0              | 9/20/17              | 10:35              | SOIL                 |                 |                                 | X  | X   |   |   |   |   |  |          |                                      |
| 3  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 4  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 5  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 6  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 7  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 8  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 9  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 10   |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Lucho</u>  |   | Date: <u>9/20/17</u> |                    | Time: <u>1300</u>    |                 | Relinquished By: _____          |  |   |   | Date: _____   |   | Time: _____   |  |          |                                      |
| Received By: <u>Almundo</u>  |   | Date: <u>9.20.17</u> |                    | Time: <u>1300</u>    |                 | Total Number of Packages: _____ |  |   |   |   |   |   |  |          |                                      |

Page 1 of 1 List Hazardous Contaminants: \_\_\_\_\_

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**BROOKS  
APPLIED  
LABS**

# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466 / *L. Kerner*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Lawson* For BAL Use Only Date: *9/21/17* BAL Report 1803009  
 Work Order ID: \_\_\_\_\_ Time: *9:10*  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection                  |                   | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |
|---|-----------------------------|-------------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|
|   | Date                        | Time              | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Specify Here                |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| Sample ID   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 1   | SO-PTC-129-092017-10.0-12.0 | 9/20/17 1315      | SOIL                      | 1                    |                 |                   | X  | X   | X   |   |   |   |  |          |
| 2   | SO-PTC-129-092017-17.3-20.0 | 9/20/17 1320      | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |          |
| 3   | SO-PTC-129-092017-22.5-25.0 | 9/20/17 1325      | SOIL                      | 1                    |                 |                   | X  | X   | X   |   |   |   |  |          |
| 4   | SO-PTC-129-092017-35.8-36.5 | 9/20/17 1500      | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |          |
| 5   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 6   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 7   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 8   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 9   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 10  |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| Trip Blank (specify)  |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| Relinquished By: <i>[Signature]</i>   | Date: <i>9/21/17</i>        | Time: <i>9:10</i> | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |  |          |
| Received By: <i>[Signature]</i>   | Date: <i>9/21/17</i>        | Time: <i>9:10</i> | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |  |          |

Page \_\_\_\_ of \_\_\_\_ List Hazardous Contaminants: \_\_\_\_\_

samples@brooksupplied.com | brooksupplied.com

**Print**



18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 19, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Revision 1: Following the submission of the original report, the client observed a typo in the chain of custody (COC) form describing the samples collected on September 12, 2018. For the sample collected (09/12/18 13:00), the field ID should have been listed as **SD-125+50-0-SED-091218-0-0.33** rather than **SD-125+00-0-SED-091218-0-0.33**. In this revised report the sample ID for 1837061-02 has been corrected from **SD-125+00-0-SED-091218-0-0.33** to **SD-125+50-0-SED-091218-0-0.33**. No other changes have been made, with respect to the initial report issued on November 9, 2018.

Mr. Troy Bussey,

On September 14<sup>th</sup> through September 21<sup>st</sup>, 2018, Brooks Applied Labs (BAL) received eight (8) soil/sediment samples. The samples were logged-in for %TS and total recoverable arsenic [As] analysis, according to the chain-of-custody forms. A five-step selective sequential extraction (SSE) method, based on *Wenzel et al.*, was employed for correlation between metals (aluminum [Al], arsenic [As], iron [Fe], manganese [Mn], and silicon [Si]) and different substrate properties.

All samples were stored and prepped anoxically in an oxygen free glove box. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

Shortly after receipt, all submitted core samples were unpacked in a glove box maintained under anoxic conditions, split into appropriate sample containers, and then stored according to BAL SOPs. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

### **Total Solids Analysis**

#### **Batch B182921**

A known mass of each soil sample was placed into a pre-weighed pan, then the combined mass of the sample and pan was recorded. All samples were placed into a convection oven maintained at a temperature of 105°C. After drying for a minimum of forty-eight (48) hours, all samples were briefly cooled and reweighed. The total solids percentage of each sample was calculated by dividing the weight of the dried sample by the weight of the original sample.

### **Total Recoverable Arsenic Quantitation by ICP-QQQ-MS**

Total recoverable arsenic quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Prior to analysis a known mass of each sample was digested with

aliquots of concentrated HNO<sub>3</sub> and H<sub>2</sub>O<sub>2</sub> in a hot block apparatus, in accordance with a modified EPA Method 3050B.

#### Batch B182466

The total metals results were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values and MRL values are determined by MDL studies. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample concentration, the recoveries and the relative percent difference (RPD) are not considered valid indicators of data quality. In such instances, the recoveries of the laboratory fortified blanks (BS) and/or standard reference materials (SRM) demonstrate the accuracy of the applied methods. When the spiking level was less than 25% of the native sample concentration, the spike recovery was not reported (NR) and the relative percent difference (RPD) of the MS/MSD set was not calculated (N/C).

#### **Al, As, Fe, Mn, and Si (Five Step SSE (Wenzel et al.)) Quantitation by ICP-QQQ-MS**

Metals quantitation ([Al], [As], [Fe], [Mn], and [Si]) was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Prior to the analyses, a sequential extraction method, based on Wenzel et al., was employed. The applied extraction solutions are designed to target the different substrate components. The following table provides details on the various fractions in the Five Step SSE (Wenzel et al.). At the request of the client, step one Five Step SSE (Wenzel et al.) of the extraction is not used in for this project. Consequently, the table begins with step two of the SSE.

#### **Five Step SSE (Wenzel et al.)**

| <b>SSE Extraction Step</b> | <b>Analyte Code</b> | <b>Extraction Liquid Identity</b>                                       | <b>Volume Extraction Liquid (mL)</b> | <b>Target Fraction/Substrate Description</b> |
|----------------------------|---------------------|---|--------------------------------------|--|
| 2                          | xx(WEN2)            | 0.05 M (NH <sub>4</sub> ) H <sub>2</sub> PO <sub>4</sub>                | 25                                   | Specifically-sorbed metals                   |
| 3                          | xx(WEN3)            | 0.2M ammonium oxalate buffer (pH=3.25)                                  | 25                                   | Amorphous metal oxyhydroxides                |
| 4                          | xx(WEN4)            | 0.2M ammonium oxalate buffer + 0.1M Ascorbic Acid                       | 25                                   | Crystalline metal oxyhydroxides              |
| 5                          | xx(WEN5)            | concentrated HNO <sub>3</sub> , H <sub>2</sub> O <sub>2</sub> , and HCl | 50                                   | Residual, Total Recoverable                  |
| 6                          | xx(WEN6)            | concentrated HNO <sub>3</sub> , HCl, and HF                             | 50                                   | Residual, Total digest                       |

Approximately 1g of each soil sample was transferred to a 50mL polypropylene vial and exactly 25mL of 0.05 M NH<sub>4</sub>H<sub>2</sub>PO<sub>4</sub> was added to each vial. Each vial was capped and shaken on an inverting shaker for 16 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN2", the WEN2 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 20mL of reagent water was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

All sample vials were wrapped in aluminum foil to prevent photo-oxidation and exactly 25mL of 0.2M ammonium oxalate buffer (pH=3.25) was added to each vial. Each vial was capped and shaken on an inverting shaker for 4 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN3", the WEN3 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 12.5mL of ammonium oxalate buffer was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

Exactly 25mL of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were then placed in a hotblock digestion apparatus at 96°C for 30 minutes.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN4", the WEN4 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 12.5mL of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

The residual solid pellets remaining in the vials were then digested with aliquots of concentrated HNO<sub>3</sub>, HCl, and H<sub>2</sub>O<sub>2</sub> (in accordance with a modified EPA Method 3050B). The samples were removed from the hot block apparatus and allowed to cool. The samples were centrifuged for 20 minutes at 3000RPM. Afterward, the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN5".

The residual solid pellets remaining in the vials were then digested in a closed vessel (bomb) with concentrated nitric, hydrochloric, and hydrofluoric acids, in accordance with a modified EPA Method 3052. The resulting digests were labeled "WEN6".

All samples were stored and prepped anoxically in an oxygen free glove box. Degassed reagent water was used to prepare extraction solutions for each step, except for steps 5 and 6 (i.e. residual metals fractions). For each fraction requiring an inverting rotator, the tumbling step took place in an anoxic environment (glovebox).

Total recoverable metals quantitation on individual fractions was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

#### Batch B180106 (WEN2 analyses)

The relative percent difference (RPD) value for manganese in the laboratory duplicate sample, B180106-DUP2, was greater than the control limit of 30%, at 35%. Re-analysis confirmed the result. The manganese result for the source sample, 1803009-13, should be considered estimated due to poor precision, and has been qualified "M".

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of

the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is typically set by the value of a low calibration standard in the calibration. BAL requires that the MRL is at least 2 times the values of the MDL. Due to elevated MDLs, it was necessary to raise the MRL to 2 times the value of the MDL for arsenic results. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

The counts per second (CPS) value for iron in the third method blank sample, B180106-BLK1, was elevated, indicating a possible error in sampling by the autosampler. The iron value for this sample (0.574 mg/kg) was omitted from calculations used to determine the MDLs associated with iron results.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182472 (WEN2 analyses)

The analyst noted some precipitate in the extracts from the Wenzel step two. An additional step was employed at the instrument, where the analyst added concentrated HNO<sub>3</sub> to the extracts prior to adding the diluent. The samples were allowed to sit for a few minutes before adding the diluent. Any precipitates observed were solubilized upon the addition of the concentrated acid.

The relative percent difference (RPD) value for aluminum in the laboratory duplicate sample, B182472-DUP1, was greater than the control limit of 25%, at 51%. Re-analysis confirmed the result. The aluminum result for the source sample, 1837061-02, should be considered estimated due to poor precision, and has been qualified "M".

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182810 (WEN2 analyses)

The analyst noted some precipitate in the extracts from the Wenzel step two. An additional step was employed at the instrument, where the analyst added concentrated HNO<sub>3</sub> to the extracts prior to adding the diluent. The samples were allowed to sit for a few minutes before adding the diluent. Any precipitates observed were solubilized upon the addition of the concentrated acid.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of

the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182473 (WEN3 analyses)

The RPD value for iron in the laboratory duplicate sample, B182473-DUP1, was greater than the control limit of 25%, at 43%. Re-analysis confirmed the result. The iron result for the source sample, 1837061-02, should be considered estimated due to poor precision, and has been qualified "M".

The RPD value for manganese in the laboratory duplicate sample, B182473-DUP3, was greater than the control limit of 25%, at 82%. Re-analysis confirmed the result. The manganese result for the source sample, 1837061-02, should be considered estimated due to poor precision, and has been qualified "M".

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182811 (WEN3 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182474 (WEN4 analyses)



The RPD values for iron, manganese, and silicon in the laboratory duplicate sample, B182474-DUP1, were greater than the control limit of 25%, at 26%, 43%, and 98%, respectively. Re-analysis confirmed the results. The iron, manganese, and silicon results for the source sample, 1837061-02, should be considered estimated due to poor precision, and have been qualified "M".

The analyst determined that B182474-PS2 was not spiked with silicon. Consequently, the silicon result for B182474-PS2 is not reported.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182812 (WEN4 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182475 (WEN5 analyses)

The aluminum result for the third method blank, identified as B182475-BLK3, is a statistical outlier according to the Grubb's Test. The value for this sample was omitted from calculations used to determine the MDL associated with aluminum results. All results associated with the aluminum method blank outlier were greater than ten times the elevated method blank value. The method blank outlier should have no impact on data quality. No data were qualified based on the elevated aluminum result in B182475-BLK3.

The silicon spike recovery for the reference material sample, B182475-SRM2, is less than the lower control limit of 75% (at 33%). Re-analyses confirmed the result. All silicon results in Batch B182475 should be considered estimated and have been qualified "J-1" to indicate a potential low bias.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of



the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182813 (WEN5 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182476 (WEN6 analyses)

The aluminum spike recovery for the reference material sample, B182476-SRM2, is less than the lower control limit of 45% (at 68%). Re-analyses confirmed the result. All aluminum results in Batch B182476 should be considered estimated and have been qualified "J-1" to indicate a potential low bias.

The iron result for the first method blank, identified as B182476-BLK1, is a statistical outlier according to the Grubb's Test. The value for this sample was omitted from calculations used to determine the MDL associated with aluminum results. All results associated with the iron method blank outlier were greater than ten times the elevated method blank value. The method blank outlier should have no impact on data quality. No data were qualified based on the elevated iron result in B182476-BLK1.

The RPD values for aluminum, iron, and manganese in the laboratory duplicate sample, B182476-DUP3, were greater than the control limit of 25%, at 47%, 44%, and 71%, respectively. Re-analysis confirmed the results. The aluminum, iron, and manganese results for the source sample, 1837061-02, should be considered estimated due to poor precision, and have been qualified "M".

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

Batch B182923 (WEN6 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.


In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**NC**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

With the exceptions noted above, all associated quality control sample results met the acceptance criteria. BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,



Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Please see narrative for explanation.                                      |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.                               |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Please see narrative for explanation.  |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Information

| <b>Sample</b>                          | <b>Lab ID</b> | <b>Report Matrix</b> | <b>Type</b> | <b>Sampled</b> | <b>Received</b> |
|--|---------------|----------------------|-------------|----------------|-----------------|
| <i>SD-125+00-ST1-SED-091218-0-0.33</i> | 1837061-01    | Sediment             | Sample      | 09/12/2018     | 09/14/2018      |
| <i>SD-125+50-0-SED-091218-0-0.33</i>   | 1837061-02    | Sediment             | Sample      | 09/12/2018     | 09/14/2018      |
| <i>SO-PTC-122-091818-9.5-10.5</i>      | 1837061-03    | Soil                 | Sample      | 09/18/2018     | 09/18/2018      |
| <i>SO-PTC-127-091818-17.0-17.5</i>     | 1837061-04    | Soil                 | Sample      | 09/18/2018     | 09/18/2018      |
| <i>SO-PTC-112-092018-17.0-18.0</i>     | 1837061-05    | So                   | Sample      | 09/20/2018     | 09/21/2018      |
| <i>SO-PTC-104-092018-14.2-14.7</i>     | 1837061-06    | So                   | Sample      | 09/20/2018     | 09/21/2018      |
| <i>SO-PTC-120-092118-11.0-12.0</i>     | 1837061-07    | So                   | Sample      | 09/21/2018     | 09/21/2018      |
| <i>SO-PTC-108-092118-13.2-14.2</i>     | 1837061-08    | So                   | Sample      | 09/21/2018     | 09/21/2018      |



## Batch Summary

| Analyte  | Lab Matrix    | Method        | Prepared   | Analyzed   | Batch   | Sequence |
|----------|---------------|---------------|------------|------------|---------|----------|
| %TS      | Soil/Sediment | SM 2540G      | 10/02/2018 | 10/30/2018 | B182921 | N/A      |
| Al(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/16/2018 | B182472 | 1801410  |
| Al(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| Al(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182474 | 1801410  |
| Al(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/16/2018 | B182475 | 1801410  |
| Al(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/30/2018 | B182475 | 1801459  |
| Al(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/30/2018 | B182476 | 1801459  |
| As       | Soil/Sediment | EPA 6020B Mod | 10/11/2018 | 10/13/2018 | B182466 | 1801398  |
| As       | Soil/Sediment | EPA 6020B Mod | 10/11/2018 | 10/17/2018 | B182466 | 1801410  |
| As(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/29/2018 | B182810 | 1801459  |
| As(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| As(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/29/2018 | B182811 | 1801459  |
| As(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/29/2018 | B182812 | 1801459  |
| As(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/30/2018 | B182813 | 1801459  |
| As(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/30/2018 | B182476 | 1801459  |
| Fe(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/16/2018 | B182472 | 1801410  |
| Fe(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| Fe(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/29/2018 | B182473 | 1801459  |
| Fe(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182474 | 1801410  |
| Fe(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/16/2018 | B182475 | 1801410  |
| Fe(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/30/2018 | B182475 | 1801459  |
| Fe(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/30/2018 | B182476 | 1801459  |
| Mn(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/16/2018 | B182472 | 1801410  |
| Mn(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| Mn(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/29/2018 | B182473 | 1801459  |
| Mn(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182474 | 1801410  |
| Mn(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/16/2018 | B182475 | 1801410  |
| Mn(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/30/2018 | B182475 | 1801459  |
| Mn(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/30/2018 | B182476 | 1801459  |
| Si(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/16/2018 | B182472 | 1801410  |
| Si(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| Si(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182474 | 1801410  |
| Si(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/16/2018 | B182475 | 1801410  |
| Si(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/31/2018 | B182923 | 1801474  |



## Sample Results

| Sample                                 | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|--|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SD-125+00-ST1-SED-091218-0-0.33</b> |          |               |       |        |           |       |       |       |         |          |
| 1837061-01                             | %TS      | Sediment      | NA    | 74.89  |           | 0.005 | 0.02  | %     | B182921 | N/A      |
| 1837061-01                             | Al(WEN2) | Sediment      | dry   | 5.29   |           | 0.178 | 0.331 | mg/kg | B182472 | 1801410  |
| 1837061-01                             | Al(WEN3) | Sediment      | dry   | 509    |           | 0.203 | 0.381 | mg/kg | B182473 | 1801410  |
| 1837061-01                             | Al(WEN4) | Sediment      | dry   | 322    |           | 0.508 | 1.02  | mg/kg | B182474 | 1801410  |
| 1837061-01                             | Al(WEN5) | Sediment      | dry   | 8050   |           | 0.508 | 1.02  | mg/kg | B182475 | 1801410  |
| 1837061-01                             | Al(WEN6) | Sediment      | dry   | 21900  | J-1       | 50.8  | 102   | mg/kg | B182476 | 1801459  |
| 1837061-01                             | As       | Sediment      | dry   | 12.6   |           | 0.479 | 1.12  | mg/kg | B182466 | 1801398  |
| 1837061-01                             | As(WEN2) | Sediment      | dry   | 2.35   |           | 0.076 | 0.127 | mg/kg | B182810 | 1801459  |
| 1837061-01                             | As(WEN3) | Sediment      | dry   | 1.39   |           | 0.254 | 0.508 | mg/kg | B182473 | 1801410  |
| 1837061-01                             | As(WEN4) | Sediment      | dry   | 0.452  | J         | 0.381 | 0.763 | mg/kg | B182812 | 1801459  |
| 1837061-01                             | As(WEN5) | Sediment      | dry   | 4.02   |           | 1.12  | 2.24  | mg/kg | B182813 | 1801459  |
| 1837061-01                             | As(WEN6) | Sediment      | dry   | ≤ 4.07 | U         | 4.07  | 10.2  | mg/kg | B182476 | 1801459  |
| 1837061-01                             | Fe(WEN2) | Sediment      | dry   | 620    |           | 0.407 | 0.788 | mg/kg | B182472 | 1801410  |
| 1837061-01                             | Fe(WEN3) | Sediment      | dry   | 3240   |           | 0.508 | 1.02  | mg/kg | B182473 | 1801410  |
| 1837061-01                             | Fe(WEN4) | Sediment      | dry   | 731    |           | 0.508 | 1.27  | mg/kg | B182474 | 1801410  |
| 1837061-01                             | Fe(WEN5) | Sediment      | dry   | 10200  |           | 10.2  | 20.3  | mg/kg | B182475 | 1801410  |
| 1837061-01                             | Fe(WEN6) | Sediment      | dry   | 8850   |           | 26.4  | 50.8  | mg/kg | B182476 | 1801459  |
| 1837061-01                             | Mn(WEN2) | Sediment      | dry   | 5.66   |           | 0.003 | 0.025 | mg/kg | B182472 | 1801410  |
| 1837061-01                             | Mn(WEN3) | Sediment      | dry   | 16.0   |           | 0.127 | 0.229 | mg/kg | B182473 | 1801410  |
| 1837061-01                             | Mn(WEN4) | Sediment      | dry   | 3.80   |           | 0.102 | 0.203 | mg/kg | B182474 | 1801410  |
| 1837061-01                             | Mn(WEN5) | Sediment      | dry   | 127    |           | 0.203 | 0.508 | mg/kg | B182475 | 1801459  |
| 1837061-01                             | Mn(WEN6) | Sediment      | dry   | 173    |           | 0.610 | 1.22  | mg/kg | B182476 | 1801459  |
| 1837061-01                             | Si(WEN2) | Sediment      | dry   | 228    |           | 1.27  | 2.54  | mg/kg | B182472 | 1801410  |
| 1837061-01                             | Si(WEN3) | Sediment      | dry   | 243    |           | 1.53  | 3.05  | mg/kg | B182473 | 1801410  |
| 1837061-01                             | Si(WEN4) | Sediment      | dry   | 203    |           | 1.65  | 3.31  | mg/kg | B182474 | 1801410  |
| 1837061-01                             | Si(WEN5) | Sediment      | dry   | 46.2   | J-1       | 3.56  | 7.12  | mg/kg | B182475 | 1801410  |
| 1837061-01                             | Si(WEN6) | Sediment      | dry   | 208000 |           | 976   | 1950  | mg/kg | B182923 | 1801474  |



## Sample Results

| Sample                               | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|--------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SD-125+50-0-SED-091218-0-0.33</b> |          |               |       |        |           |       |       |       |         |          |
| 1837061-02                           | %TS      | Sediment      | NA    | 80.51  |           | 0.005 | 0.02  | %     | B182921 | N/A      |
| 1837061-02                           | Al(WEN2) | Sediment      | dry   | 3.22   | M         | 0.176 | 0.326 | mg/kg | B182472 | 1801410  |
| 1837061-02                           | Al(WEN3) | Sediment      | dry   | 229    |           | 0.201 | 0.376 | mg/kg | B182473 | 1801410  |
| 1837061-02                           | Al(WEN4) | Sediment      | dry   | 351    |           | 0.502 | 1.00  | mg/kg | B182474 | 1801410  |
| 1837061-02                           | Al(WEN5) | Sediment      | dry   | 10600  |           | 0.502 | 1.00  | mg/kg | B182475 | 1801410  |
| 1837061-02                           | Al(WEN6) | Sediment      | dry   | 25900  | J-1 M     | 50.2  | 100   | mg/kg | B182476 | 1801459  |
| 1837061-02                           | As       | Sediment      | dry   | 3.95   |           | 0.445 | 1.04  | mg/kg | B182466 | 1801398  |
| 1837061-02                           | As(WEN2) | Sediment      | dry   | 0.540  |           | 0.075 | 0.125 | mg/kg | B182810 | 1801459  |
| 1837061-02                           | As(WEN3) | Sediment      | dry   | 1.06   |           | 0.251 | 0.502 | mg/kg | B182473 | 1801410  |
| 1837061-02                           | As(WEN4) | Sediment      | dry   | 0.878  |           | 0.376 | 0.752 | mg/kg | B182812 | 1801459  |
| 1837061-02                           | As(WEN5) | Sediment      | dry   | 1.94   | J         | 1.10  | 2.21  | mg/kg | B182813 | 1801459  |
| 1837061-02                           | As(WEN6) | Sediment      | dry   | ≤ 4.01 | U         | 4.01  | 10.0  | mg/kg | B182476 | 1801459  |
| 1837061-02                           | Fe(WEN2) | Sediment      | dry   | 0.939  |           | 0.401 | 0.778 | mg/kg | B182472 | 1801410  |
| 1837061-02                           | Fe(WEN3) | Sediment      | dry   | 808    | M         | 0.502 | 1.00  | mg/kg | B182473 | 1801410  |
| 1837061-02                           | Fe(WEN4) | Sediment      | dry   | 2400   | M         | 0.502 | 1.25  | mg/kg | B182474 | 1801410  |
| 1837061-02                           | Fe(WEN5) | Sediment      | dry   | 14500  |           | 40.1  | 80.3  | mg/kg | B182475 | 1801459  |
| 1837061-02                           | Fe(WEN6) | Sediment      | dry   | 11100  | M         | 26.1  | 50.2  | mg/kg | B182476 | 1801459  |
| 1837061-02                           | Mn(WEN2) | Sediment      | dry   | 60.8   |           | 0.003 | 0.025 | mg/kg | B182472 | 1801410  |
| 1837061-02                           | Mn(WEN3) | Sediment      | dry   | 140    | M         | 5.02  | 9.03  | mg/kg | B182473 | 1801459  |
| 1837061-02                           | Mn(WEN4) | Sediment      | dry   | 22.8   | M         | 0.100 | 0.201 | mg/kg | B182474 | 1801410  |
| 1837061-02                           | Mn(WEN5) | Sediment      | dry   | 229    |           | 0.201 | 0.502 | mg/kg | B182475 | 1801459  |
| 1837061-02                           | Mn(WEN6) | Sediment      | dry   | 259    | M         | 0.602 | 1.20  | mg/kg | B182476 | 1801459  |
| 1837061-02                           | Si(WEN2) | Sediment      | dry   | 86.4   |           | 1.25  | 2.51  | mg/kg | B182472 | 1801410  |
| 1837061-02                           | Si(WEN3) | Sediment      | dry   | 110    |           | 1.50  | 3.01  | mg/kg | B182473 | 1801410  |
| 1837061-02                           | Si(WEN4) | Sediment      | dry   | 253    | M         | 1.63  | 3.26  | mg/kg | B182474 | 1801410  |
| 1837061-02                           | Si(WEN5) | Sediment      | dry   | 55.8   | J-1       | 3.51  | 7.02  | mg/kg | B182475 | 1801410  |
| 1837061-02                           | Si(WEN6) | Sediment      | dry   | 306000 |           | 963   | 1930  | mg/kg | B182923 | 1801474  |





## Sample Results

| Sample                            | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|-----------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-122-091818-9.5-10.5</b> |          |               |       |        |           |       |       |       |         |          |
| 1837061-03                        | %TS      | Soil          | NA    | 48.30  |           | 0.005 | 0.02  | %     | B182921 | N/A      |
| 1837061-03                        | Al(WEN2) | Soil          | dry   | 57.9   |           | 0.175 | 0.325 | mg/kg | B182472 | 1801410  |
| 1837061-03                        | Al(WEN3) | Soil          | dry   | 990    |           | 0.200 | 0.375 | mg/kg | B182473 | 1801410  |
| 1837061-03                        | Al(WEN4) | Soil          | dry   | 929    |           | 0.501 | 1.00  | mg/kg | B182474 | 1801410  |
| 1837061-03                        | Al(WEN5) | Soil          | dry   | 11300  |           | 200   | 400   | mg/kg | B182475 | 1801459  |
| 1837061-03                        | Al(WEN6) | Soil          | dry   | 24600  | J-1       | 50.1  | 100   | mg/kg | B182476 | 1801459  |
| 1837061-03                        | As       | Soil          | dry   | 7720   |           | 0.746 | 1.74  | mg/kg | B182466 | 1801398  |
| 1837061-03                        | As(WEN2) | Soil          | dry   | 599    |           | 3.00  | 5.01  | mg/kg | B182810 | 1801459  |
| 1837061-03                        | As(WEN3) | Soil          | dry   | 220    |           | 0.501 | 1.00  | mg/kg | B182811 | 1801459  |
| 1837061-03                        | As(WEN4) | Soil          | dry   | 38.6   |           | 0.375 | 0.751 | mg/kg | B182812 | 1801459  |
| 1837061-03                        | As(WEN5) | Soil          | dry   | 8250   |           | 110   | 220   | mg/kg | B182813 | 1801459  |
| 1837061-03                        | As(WEN6) | Soil          | dry   | 83.1   |           | 4.00  | 10.0  | mg/kg | B182476 | 1801459  |
| 1837061-03                        | Fe(WEN2) | Soil          | dry   | 99.1   |           | 0.400 | 0.776 | mg/kg | B182472 | 1801410  |
| 1837061-03                        | Fe(WEN3) | Soil          | dry   | 8220   |           | 20.0  | 40.0  | mg/kg | B182473 | 1801459  |
| 1837061-03                        | Fe(WEN4) | Soil          | dry   | 2190   |           | 0.501 | 1.25  | mg/kg | B182474 | 1801410  |
| 1837061-03                        | Fe(WEN5) | Soil          | dry   | 10100  |           | 10.0  | 20.0  | mg/kg | B182475 | 1801410  |
| 1837061-03                        | Fe(WEN6) | Soil          | dry   | 10300  |           | 26.0  | 50.1  | mg/kg | B182476 | 1801459  |
| 1837061-03                        | Mn(WEN2) | Soil          | dry   | 12.8   |           | 0.003 | 0.025 | mg/kg | B182472 | 1801410  |
| 1837061-03                        | Mn(WEN3) | Soil          | dry   | 295    |           |       |       | mg/kg | B182473 | 1801459  |
| 1837061-03                        | Mn(WEN4) | Soil          | dry   | 20.6   |           | 0.100 | 0.200 | mg/kg | B182474 | 1801410  |
| 1837061-03                        | Mn(WEN5) | Soil          | dry   | 86.4   |           | 0.050 | 0.125 | mg/kg | B182475 | 1801410  |
| 1837061-03                        | Mn(WEN6) | Soil          | dry   | 184    |           | 0.601 | 1.20  | mg/kg | B182476 | 1801459  |
| 1837061-03                        | Si(WEN2) | Soil          | dry   | 871    |           | 1.25  | 2.50  | mg/kg | B182472 | 1801410  |
| 1837061-03                        | Si(WEN3) | Soil          | dry   | 703    |           | 1.50  | 3.00  | mg/kg | B182473 | 1801410  |
| 1837061-03                        | Si(WEN4) | Soil          | dry   | 593    |           | 1.63  | 3.25  | mg/kg | B182474 | 1801410  |
| 1837061-03                        | Si(WEN5) | Soil          | dry   | 55.3   | J-1       | 3.50  | 7.01  | mg/kg | B182475 | 1801410  |
| 1837061-03                        | Si(WEN6) | Soil          | dry   | 237000 |           | 961   | 1920  | mg/kg | B182923 | 1801474  |





## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-127-091818-17.0-17.5</b> |          |               |       |        |           |       |       |       |         |          |
| 1837061-04                         | %TS      | Soil          | NA    | 42.73  |           | 0.005 | 0.02  | %     | B182921 | N/A      |
| 1837061-04                         | Al(WEN2) | Soil          | dry   | 199    |           | 0.178 | 0.330 | mg/kg | B182472 | 1801410  |
| 1837061-04                         | Al(WEN3) | Soil          | dry   | 936    |           | 0.203 | 0.380 | mg/kg | B182473 | 1801410  |
| 1837061-04                         | Al(WEN4) | Soil          | dry   | 860    |           | 0.507 | 1.01  | mg/kg | B182474 | 1801410  |
| 1837061-04                         | Al(WEN5) | Soil          | dry   | 10800  |           | 0.507 | 1.01  | mg/kg | B182475 | 1801410  |
| 1837061-04                         | Al(WEN6) | Soil          | dry   | 22300  | J-1       | 50.7  | 101   | mg/kg | B182476 | 1801459  |
| 1837061-04                         | As       | Soil          | dry   | 4150   |           | 0.842 | 1.97  | mg/kg | B182466 | 1801398  |
| 1837061-04                         | As(WEN2) | Soil          | dry   | 2230   |           | 3.04  | 5.07  | mg/kg | B182810 | 1801459  |
| 1837061-04                         | As(WEN3) | Soil          | dry   | 75.8   |           | 0.507 | 1.01  | mg/kg | B182811 | 1801459  |
| 1837061-04                         | As(WEN4) | Soil          | dry   | 34.2   |           | 0.380 | 0.761 | mg/kg | B182812 | 1801459  |
| 1837061-04                         | As(WEN5) | Soil          | dry   | 2050   |           | 112   | 223   | mg/kg | B182813 | 1801459  |
| 1837061-04                         | As(WEN6) | Soil          | dry   | 38.4   |           | 4.06  | 10.1  | mg/kg | B182476 | 1801459  |
| 1837061-04                         | Fe(WEN2) | Soil          | dry   | 216    |           | 0.406 | 0.786 | mg/kg | B182472 | 1801410  |
| 1837061-04                         | Fe(WEN3) | Soil          | dry   | 835    |           | 20.3  | 40.6  | mg/kg | B182473 | 1801459  |
| 1837061-04                         | Fe(WEN4) | Soil          | dry   | 951    |           | 0.507 | 1.27  | mg/kg | B182474 | 1801410  |
| 1837061-04                         | Fe(WEN5) | Soil          | dry   | 10000  |           | 10.1  | 20.3  | mg/kg | B182475 | 1801410  |
| 1837061-04                         | Fe(WEN6) | Soil          | dry   | 5770   |           | 26.4  | 50.7  | mg/kg | B182476 | 1801459  |
| 1837061-04                         | Mn(WEN2) | Soil          | dry   | 3.29   |           | 0.003 | 0.025 | mg/kg | B182472 | 1801410  |
| 1837061-04                         | Mn(WEN3) | Soil          | dry   | 18.0   |           | 0.127 | 0.228 | mg/kg | B182473 | 1801410  |
| 1837061-04                         | Mn(WEN4) | Soil          | dry   | 9.06   |           | 0.101 | 0.203 | mg/kg | B182474 | 1801410  |
| 1837061-04                         | Mn(WEN5) | Soil          | dry   | 57.8   |           | 0.051 | 0.127 | mg/kg | B182475 | 1801410  |
| 1837061-04                         | Mn(WEN6) | Soil          | dry   | 101    |           | 0.609 | 1.22  | mg/kg | B182476 | 1801459  |
| 1837061-04                         | Si(WEN2) | Soil          | dry   | 668    |           | 1.27  | 2.54  | mg/kg | B182472 | 1801410  |
| 1837061-04                         | Si(WEN3) | Soil          | dry   | 298    |           | 1.52  | 3.04  | mg/kg | B182473 | 1801410  |
| 1837061-04                         | Si(WEN4) | Soil          | dry   | 658    |           | 1.65  | 3.30  | mg/kg | B182474 | 1801410  |
| 1837061-04                         | Si(WEN5) | Soil          | dry   | 52.8   | J-1       | 3.55  | 7.10  | mg/kg | B182475 | 1801410  |
| 1837061-04                         | Si(WEN6) | Soil          | dry   | 179000 |           | 974   | 1950  | mg/kg | B182923 | 1801474  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-112-092018-17.0-18.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1837061-05                         | %TS      | So            | NA    | 62.75  |           | 0.005 | 0.02  | %     | B182921 | N/A      |
| 1837061-05                         | Al(WEN2) | So            | dry   | 67.1   |           | 0.175 | 0.325 | mg/kg | B182472 | 1801410  |
| 1837061-05                         | Al(WEN3) | So            | dry   | 776    |           | 0.200 | 0.375 | mg/kg | B182473 | 1801410  |
| 1837061-05                         | Al(WEN4) | So            | dry   | 1160   |           | 0.500 | 1.00  | mg/kg | B182474 | 1801410  |
| 1837061-05                         | Al(WEN5) | So            | dry   | 12200  |           | 0.500 | 1.00  | mg/kg | B182475 | 1801410  |
| 1837061-05                         | Al(WEN6) | So            | dry   | 24800  | J-1       | 50.0  | 100   | mg/kg | B182476 | 1801459  |
| 1837061-05                         | As       | So            | dry   | 1080   |           | 0.574 | 1.34  | mg/kg | B182466 | 1801398  |
| 1837061-05                         | As(WEN2) | So            | dry   | 648    |           | 3.00  | 5.00  | mg/kg | B182810 | 1801459  |
| 1837061-05                         | As(WEN3) | So            | dry   | 70.7   |           | 0.500 | 1.00  | mg/kg | B182811 | 1801459  |
| 1837061-05                         | As(WEN4) | So            | dry   | 34.4   |           | 0.375 | 0.750 | mg/kg | B182812 | 1801459  |
| 1837061-05                         | As(WEN5) | So            | dry   | 809    |           | 110   | 220   | mg/kg | B182813 | 1801459  |
| 1837061-05                         | As(WEN6) | So            | dry   | 11.6   |           | 4.00  | 10.0  | mg/kg | B182476 | 1801459  |
| 1837061-05                         | Fe(WEN2) | So            | dry   | 15.7   |           | 0.400 | 0.775 | mg/kg | B182472 | 1801410  |
| 1837061-05                         | Fe(WEN3) | So            | dry   | 292    |           | 0.500 | 1.00  | mg/kg | B182473 | 1801410  |
| 1837061-05                         | Fe(WEN4) | So            | dry   | 1620   |           | 0.500 | 1.25  | mg/kg | B182474 | 1801410  |
| 1837061-05                         | Fe(WEN5) | So            | dry   | 11500  |           | 10.0  | 20.0  | mg/kg | B182475 | 1801410  |
| 1837061-05                         | Fe(WEN6) | So            | dry   | 8750   |           | 26.0  | 50.0  | mg/kg | B182476 | 1801459  |
| 1837061-05                         | Mn(WEN2) | So            | dry   | 2.00   |           | 0.002 | 0.025 | mg/kg | B182472 | 1801410  |
| 1837061-05                         | Mn(WEN3) | So            | dry   | 6.13   |           | 0.125 | 0.225 | mg/kg | B182473 | 1801410  |
| 1837061-05                         | Mn(WEN4) | So            | dry   | 10.2   |           | 0.100 | 0.200 | mg/kg | B182474 | 1801410  |
| 1837061-05                         | Mn(WEN5) | So            | dry   | 105    |           | 0.050 | 0.125 | mg/kg | B182475 | 1801410  |
| 1837061-05                         | Mn(WEN6) | So            | dry   | 157    |           | 0.600 | 1.20  | mg/kg | B182476 | 1801459  |
| 1837061-05                         | Si(WEN2) | So            | dry   | 224    |           | 1.25  | 2.50  | mg/kg | B182472 | 1801410  |
| 1837061-05                         | Si(WEN3) | So            | dry   | 232    |           | 1.50  | 3.00  | mg/kg | B182473 | 1801410  |
| 1837061-05                         | Si(WEN4) | So            | dry   | 651    |           | 1.62  | 3.25  | mg/kg | B182474 | 1801410  |
| 1837061-05                         | Si(WEN5) | So            | dry   | 56.7   | J-1       | 3.50  | 7.00  | mg/kg | B182475 | 1801410  |
| 1837061-05                         | Si(WEN6) | So            | dry   | 211000 |           | 960   | 1920  | mg/kg | B182923 | 1801474  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-104-092018-14.2-14.7</b> |          |               |       |        |           |       |       |       |         |          |
| 1837061-06                         | %TS      | So            | NA    | 53.25  |           | 0.005 | 0.02  | %     | B182921 | N/A      |
| 1837061-06                         | Al(WEN2) | So            | dry   | 28.1   |           | 0.176 | 0.326 | mg/kg | B182472 | 1801410  |
| 1837061-06                         | Al(WEN3) | So            | dry   | 291    |           | 0.201 | 0.376 | mg/kg | B182473 | 1801410  |
| 1837061-06                         | Al(WEN4) | So            | dry   | 580    |           | 0.502 | 1.00  | mg/kg | B182474 | 1801410  |
| 1837061-06                         | Al(WEN5) | So            | dry   | 9890   |           | 0.502 | 1.00  | mg/kg | B182475 | 1801410  |
| 1837061-06                         | Al(WEN6) | So            | dry   | 21400  | J-1       | 50.2  | 100   | mg/kg | B182476 | 1801459  |
| 1837061-06                         | As       | So            | dry   | 8690   |           | 3.38  | 7.88  | mg/kg | B182466 | 1801410  |
| 1837061-06                         | As(WEN2) | So            | dry   | 3960   |           | 15.1  | 25.1  | mg/kg | B182810 | 1801459  |
| 1837061-06                         | As(WEN3) | So            | dry   | 475    |           | 0.502 | 1.00  | mg/kg | B182811 | 1801459  |
| 1837061-06                         | As(WEN4) | So            | dry   | 111    |           | 1.51  | 3.01  | mg/kg | B182812 | 1801459  |
| 1837061-06                         | As(WEN5) | So            | dry   | 1190   |           | 110   | 221   | mg/kg | B182813 | 1801459  |
| 1837061-06                         | As(WEN6) | So            | dry   | 23.9   |           | 4.01  | 10.0  | mg/kg | B182476 | 1801459  |
| 1837061-06                         | Fe(WEN2) | So            | dry   | 59.0   |           | 0.401 | 0.778 | mg/kg | B182472 | 1801410  |
| 1837061-06                         | Fe(WEN3) | So            | dry   | 1030   |           | 0.502 | 1.00  | mg/kg | B182473 | 1801410  |
| 1837061-06                         | Fe(WEN4) | So            | dry   | 1240   |           | 0.502 | 1.25  | mg/kg | B182474 | 1801410  |
| 1837061-06                         | Fe(WEN5) | So            | dry   | 12000  |           | 4010  | 8030  | mg/kg | B182475 | 1801459  |
| 1837061-06                         | Fe(WEN6) | So            | dry   | 10400  |           | 26.1  | 50.2  | mg/kg | B182476 | 1801459  |
| 1837061-06                         | Mn(WEN2) | So            | dry   | 2.05   |           | 0.003 | 0.025 | mg/kg | B182472 | 1801410  |
| 1837061-06                         | Mn(WEN3) | So            | dry   | 17.8   |           | 0.125 | 0.226 | mg/kg | B182473 | 1801410  |
| 1837061-06                         | Mn(WEN4) | So            | dry   | 8.60   |           | 0.100 | 0.201 | mg/kg | B182474 | 1801410  |
| 1837061-06                         | Mn(WEN5) | So            | dry   | 92.3   |           | 0.050 | 0.125 | mg/kg | B182475 | 1801410  |
| 1837061-06                         | Mn(WEN6) | So            | dry   | 182    |           | 0.602 | 1.20  | mg/kg | B182476 | 1801459  |
| 1837061-06                         | Si(WEN2) | So            | dry   | 774    |           | 1.25  | 2.51  | mg/kg | B182472 | 1801410  |
| 1837061-06                         | Si(WEN3) | So            | dry   | 379    |           | 1.51  | 3.01  | mg/kg | B182473 | 1801410  |
| 1837061-06                         | Si(WEN4) | So            | dry   | 523    |           | 1.63  | 3.26  | mg/kg | B182474 | 1801410  |
| 1837061-06                         | Si(WEN5) | So            | dry   | 68.0   | J-1       | 3.51  | 7.03  | mg/kg | B182475 | 1801410  |
| 1837061-06                         | Si(WEN6) | So            | dry   | 226000 |           | 964   | 1930  | mg/kg | B182923 | 1801474  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-120-092118-11.0-12.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1837061-07                         | %TS      | So            | NA    | 59.32  |           | 0.005 | 0.02  | %     | B182921 | N/A      |
| 1837061-07                         | Al(WEN2) | So            | dry   | 84.9   |           | 0.176 | 0.327 | mg/kg | B182472 | 1801410  |
| 1837061-07                         | Al(WEN3) | So            | dry   | 1230   |           | 0.201 | 0.377 | mg/kg | B182473 | 1801410  |
| 1837061-07                         | Al(WEN4) | So            | dry   | 495    |           | 0.503 | 1.01  | mg/kg | B182474 | 1801410  |
| 1837061-07                         | Al(WEN5) | So            | dry   | 11900  |           | 0.503 | 1.01  | mg/kg | B182475 | 1801410  |
| 1837061-07                         | Al(WEN6) | So            | dry   | 21800  | J-1       | 50.3  | 101   | mg/kg | B182476 | 1801459  |
| 1837061-07                         | As       | So            | dry   | 3470   |           | 0.606 | 1.41  | mg/kg | B182466 | 1801398  |
| 1837061-07                         | As(WEN2) | So            | dry   | 127    |           | 3.02  | 5.03  | mg/kg | B182810 | 1801459  |
| 1837061-07                         | As(WEN3) | So            | dry   | 80.7   |           | 0.503 | 1.01  | mg/kg | B182811 | 1801459  |
| 1837061-07                         | As(WEN4) | So            | dry   | 19.5   |           | 0.377 | 0.754 | mg/kg | B182812 | 1801459  |
| 1837061-07                         | As(WEN5) | So            | dry   | 3660   |           | 111   | 221   | mg/kg | B182813 | 1801459  |
| 1837061-07                         | As(WEN6) | So            | dry   | 28.2   |           | 4.02  | 10.1  | mg/kg | B182476 | 1801459  |
| 1837061-07                         | Fe(WEN2) | So            | dry   | 113    |           | 0.402 | 0.779 | mg/kg | B182472 | 1801410  |
| 1837061-07                         | Fe(WEN3) | So            | dry   | 7140   |           | 20.1  | 40.2  | mg/kg | B182473 | 1801459  |
| 1837061-07                         | Fe(WEN4) | So            | dry   | 889    |           | 0.503 | 1.26  | mg/kg | B182474 | 1801410  |
| 1837061-07                         | Fe(WEN5) | So            | dry   | 9520   |           | 10.1  | 20.1  | mg/kg | B182475 | 1801410  |
| 1837061-07                         | Fe(WEN6) | So            | dry   | 14700  |           | 26.1  | 50.3  | mg/kg | B182476 | 1801459  |
| 1837061-07                         | Mn(WEN2) | So            | dry   | 5.00   |           | 0.003 | 0.025 | mg/kg | B182472 | 1801410  |
| 1837061-07                         | Mn(WEN3) | So            | dry   | 83.5   |           |       |       | mg/kg | B182473 | 1801459  |
| 1837061-07                         | Mn(WEN4) | So            | dry   | 3.93   |           | 0.101 | 0.201 | mg/kg | B182474 | 1801410  |
| 1837061-07                         | Mn(WEN5) | So            | dry   | 80.7   |           | 0.050 | 0.126 | mg/kg | B182475 | 1801410  |
| 1837061-07                         | Mn(WEN6) | So            | dry   | 268    |           | 0.603 | 1.21  | mg/kg | B182476 | 1801459  |
| 1837061-07                         | Si(WEN2) | So            | dry   | 330    |           | 1.26  | 2.51  | mg/kg | B182472 | 1801410  |
| 1837061-07                         | Si(WEN3) | So            | dry   | 431    |           | 1.51  | 3.02  | mg/kg | B182473 | 1801410  |
| 1837061-07                         | Si(WEN4) | So            | dry   | 300    |           | 1.63  | 3.27  | mg/kg | B182474 | 1801410  |
| 1837061-07                         | Si(WEN5) | So            | dry   | 47.6   | J-1       | 3.52  | 7.04  | mg/kg | B182475 | 1801410  |
| 1837061-07                         | Si(WEN6) | So            | dry   | 259000 |           | 965   | 1930  | mg/kg | B182923 | 1801474  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-108-092118-13.2-14.2</b> |          |               |       |        |           |       |       |       |         |          |
| 1837061-08                         | %TS      | So            | NA    | 44.97  |           | 0.005 | 0.02  | %     | B182921 | N/A      |
| 1837061-08                         | Al(WEN2) | So            | dry   | 19.9   |           | 0.177 | 0.328 | mg/kg | B182472 | 1801410  |
| 1837061-08                         | Al(WEN3) | So            | dry   | 1210   |           | 0.202 | 0.378 | mg/kg | B182473 | 1801410  |
| 1837061-08                         | Al(WEN4) | So            | dry   | 1050   |           | 0.504 | 1.01  | mg/kg | B182474 | 1801410  |
| 1837061-08                         | Al(WEN5) | So            | dry   | 12400  |           | 0.504 | 1.01  | mg/kg | B182475 | 1801410  |
| 1837061-08                         | Al(WEN6) | So            | dry   | 21600  | J-1       | 50.4  | 101   | mg/kg | B182476 | 1801459  |
| 1837061-08                         | As       | So            | dry   | 6190   |           | 0.801 | 1.87  | mg/kg | B182466 | 1801398  |
| 1837061-08                         | As(WEN2) | So            | dry   | 2370   |           | 15.1  | 25.2  | mg/kg | B182810 | 1801459  |
| 1837061-08                         | As(WEN3) | So            | dry   | 695    |           | 0.504 | 1.01  | mg/kg | B182811 | 1801459  |
| 1837061-08                         | As(WEN4) | So            | dry   | 128    |           | 1.51  | 3.03  | mg/kg | B182812 | 1801459  |
| 1837061-08                         | As(WEN5) | So            | dry   | 5300   |           | 111   | 222   | mg/kg | B182813 | 1801459  |
| 1837061-08                         | As(WEN6) | So            | dry   | 78.8   |           | 4.04  | 10.1  | mg/kg | B182476 | 1801459  |
| 1837061-08                         | Fe(WEN2) | So            | dry   | 650    |           | 0.404 | 0.782 | mg/kg | B182472 | 1801410  |
| 1837061-08                         | Fe(WEN3) | So            | dry   | 11600  |           | 20.2  | 40.4  | mg/kg | B182473 | 1801459  |
| 1837061-08                         | Fe(WEN4) | So            | dry   | 2320   |           | 0.504 | 1.26  | mg/kg | B182474 | 1801410  |
| 1837061-08                         | Fe(WEN5) | So            | dry   | 11200  |           | 10.1  | 20.2  | mg/kg | B182475 | 1801410  |
| 1837061-08                         | Fe(WEN6) | So            | dry   | 9060   |           | 26.2  | 50.4  | mg/kg | B182476 | 1801459  |
| 1837061-08                         | Mn(WEN2) | So            | dry   | 52.5   |           | 0.003 | 0.025 | mg/kg | B182472 | 1801410  |
| 1837061-08                         | Mn(WEN3) | So            | dry   | 129    |           |       |       | mg/kg | B182473 | 1801459  |
| 1837061-08                         | Mn(WEN4) | So            | dry   | 16.6   |           | 0.101 | 0.202 | mg/kg | B182474 | 1801410  |
| 1837061-08                         | Mn(WEN5) | So            | dry   | 81.4   |           | 0.050 | 0.126 | mg/kg | B182475 | 1801410  |
| 1837061-08                         | Mn(WEN6) | So            | dry   | 154    |           | 0.605 | 1.21  | mg/kg | B182476 | 1801459  |
| 1837061-08                         | Si(WEN2) | So            | dry   | 229    |           | 1.26  | 2.52  | mg/kg | B182472 | 1801410  |
| 1837061-08                         | Si(WEN3) | So            | dry   | 418    |           | 1.51  | 3.03  | mg/kg | B182473 | 1801410  |
| 1837061-08                         | Si(WEN4) | So            | dry   | 704    |           | 1.64  | 3.28  | mg/kg | B182474 | 1801410  |
| 1837061-08                         | Si(WEN5) | So            | dry   | 55.3   | J-1       | 3.53  | 7.06  | mg/kg | B182475 | 1801410  |
| 1837061-08                         | Si(WEN6) | So            | dry   | 224000 |           | 969   | 1940  | mg/kg | B182923 | 1801474  |



## Accuracy & Precision Summary

**Batch:** B182466  
**Lab Matrix:** Soil/Sediment  
**Method:** EPA 6020B Mod

| Sample       | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B182466-BS1  | Blank Spike, (1726034)<br>As   |        | 500.0 | 475.0  | mg/kg | 95% 75-125   |              |
| B182466-SRM1 | Standard Reference Material (1805088, CRM052-50G Loamy Clay 1)<br>As |        | 45.80 | 46.07  | mg/kg | 101% 75-125  |              |
| B182466-DUP3 | Duplicate, (1837061-06)<br>As  | 8686   |       | 8503   | mg/kg |              | 2% 30        |
| B182466-MS3  | Matrix Spike, (1837061-06)<br>As                                     | 8686   | 937.5 | 9365   | mg/kg | NR 70-130    |              |
| B182466-MSD3 | Matrix Spike Duplicate, (1837061-06)<br>As                           | 8686   | 939.5 | 9126   | mg/kg | NR 70-130    | N/C 30       |





## Accuracy & Precision Summary

Batch: B182472  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B182472-DUP1</b> | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 3.223  |       | 5.427  | mg/kg |              | 51% 25       |
|                     | Fe(WEN2)                        | 0.939  |       | 1.102  | mg/kg |              | 16% 25       |
|                     | Mn(WEN2)                        | 60.75  |       | 48.10  | mg/kg |              | 23% 25       |
|                     | Si(WEN2)                        | 86.37  |       | 76.40  | mg/kg |              | 12% 25       |
| <b>B182472-PS1</b>  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 3.223  | 62.71 | 60.65  | mg/kg | 92% 75-125   |              |
|                     | Fe(WEN2)                        | 0.939  | 62.71 | 59.28  | mg/kg | 93% 75-125   |              |
|                     | Mn(WEN2)                        | 60.75  | 6.271 | 66.26  | mg/kg | 88% 75-125   |              |
|                     | Si(WEN2)                        | 86.37  | 627.1 | 626.1  | mg/kg | 86% 75-125   |              |
| <b>B182472-PS2</b>  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 3.223  | 62.71 | 61.70  | mg/kg | 93% 75-125   |              |
|                     | Fe(WEN2)                        | 0.939  | 62.71 | 59.31  | mg/kg | 93% 75-125   |              |
|                     | Mn(WEN2)                        | 60.75  | 6.271 | 66.31  | mg/kg | 89% 75-125   |              |
|                     | Si(WEN2)                        | 86.37  | 627.1 | 615.5  | mg/kg | 84% 75-125   |              |
| <b>B182472-DUP2</b> | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 28.08  |       | 33.59  | mg/kg |              | 18% 25       |
|                     | Fe(WEN2)                        | 59.03  |       | 60.18  | mg/kg |              | 2% 25        |
|                     | Mn(WEN2)                        | 2.054  |       | 2.092  | mg/kg |              | 2% 25        |
|                     | Si(WEN2)                        | 774.5  |       | 778.7  | mg/kg |              | 0.5% 25      |
| <b>B182472-PS3</b>  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 28.08  | 62.73 | 82.88  | mg/kg | 87% 75-125   |              |
|                     | Fe(WEN2)                        | 59.03  | 62.73 | 117.8  | mg/kg | 94% 75-125   |              |
|                     | Mn(WEN2)                        | 2.054  | 6.273 | 7.705  | mg/kg | 90% 75-125   |              |
|                     | Si(WEN2)                        | 774.5  | 627.3 | 1306   | mg/kg | 85% 75-125   |              |
| <b>B182472-PS4</b>  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 28.08  | 62.73 | 83.06  | mg/kg | 88% 75-125   |              |
|                     | Fe(WEN2)                        | 59.03  | 62.73 | 116.8  | mg/kg | 92% 75-125   |              |
|                     | Mn(WEN2)                        | 2.054  | 6.273 | 7.760  | mg/kg | 91% 75-125   |              |
|                     | Si(WEN2)                        | 774.5  | 627.3 | 1294   | mg/kg | 83% 75-125   |              |



## Accuracy & Precision Summary

Batch: B182473  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182473-DUP1 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Al(WEN3)                        | 229.1  |       | 236.7  | mg/kg |              | 3% 25        |
|              | Fe(WEN3)                        | 808.2  |       | 1246   | mg/kg |              | 43% 25       |
|              | Si(WEN3)                        | 110.5  |       | 132.7  | mg/kg |              | 18% 25       |
| B182473-DUP3 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Mn(WEN3)                        | 140.2  |       | 58.62  | mg/kg |              | 82% 25       |
| B182473-PS1  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|              | Al(WEN3)                        | 229.1  | 62.71 | 291.8  | mg/kg | 100% 75-125  |              |
|              | Fe(WEN3)                        | 808.2  | 62.71 | 883.8  | mg/kg | 121% 75-125  |              |
|              | Si(WEN3)                        | 110.5  | 627.1 | 672.9  | mg/kg | 90% 75-125   |              |
| B182473-PS2  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|              | Al(WEN3)                        | 229.1  | 62.71 | 291.5  | mg/kg | 100% 75-125  |              |
|              | Fe(WEN3)                        | 808.2  | 62.71 | 876.8  | mg/kg | 110% 75-125  |              |
|              | Si(WEN3)                        | 110.5  | 627.1 | 675.1  | mg/kg | 90% 75-125   |              |
| B182473-PS5  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|              | Mn(WEN3)                        | 140.2  | 250.8 | 363.7  | mg/kg | 89% 75-125   |              |
| B182473-PS6  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|              | Mn(WEN3)                        | 140.2  | 250.8 | 361.4  | mg/kg | 88% 75-125   |              |
| B182473-DUP2 | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|              | Al(WEN3)                        | 290.6  |       | 305.4  | mg/kg |              | 5% 25        |
|              | Fe(WEN3)                        | 1028   |       | 959.9  | mg/kg |              | 7% 25        |
|              | Mn(WEN3)                        | 17.82  |       | 18.56  | mg/kg |              | 4% 25        |
|              | Si(WEN3)                        | 378.5  |       | 416.8  | mg/kg |              | 10% 25       |
| B182473-PS3  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Al(WEN3)                        | 290.6  | 62.73 | 344.6  | mg/kg | 86% 75-125   |              |
|              | Fe(WEN3)                        | 1028   | 62.73 | 1095   | mg/kg | 107% 75-125  |              |
|              | Mn(WEN3)                        | 17.82  | 6.273 | 23.84  | mg/kg | 96% 75-125   |              |
|              | Si(WEN3)                        | 378.5  | 627.3 | 938.2  | mg/kg | 89% 75-125   |              |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B182473  
**Lab Matrix:** Soil/Sediment  
**Method:** In-House

| Sample      | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182473-PS4 | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|             | Al(WEN3)                        | 290.6  | 62.73 | 346.7  | mg/kg | 89% 75-125   |              |
|             | Fe(WEN3)                        | 1028   | 62.73 | 1087   | mg/kg | 95% 75-125   |              |
|             | Mn(WEN3)                        | 17.82  | 6.273 | 23.56  | mg/kg | 91% 75-125   |              |
|             | Si(WEN3)                        | 378.5  | 627.3 | 942.6  | mg/kg | 90% 75-125   |              |



## Accuracy & Precision Summary

Batch: B182474  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B182474-DUP1</b> | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 350.6  |       | 330.8  | mg/kg |              | 6% 25        |
|                     | Fe(WEN4)                        | 2401   |       | 1851   | mg/kg |              | 26% 25       |
|                     | Mn(WEN4)                        | 22.85  |       | 14.76  | mg/kg |              | 43% 25       |
|                     | Si(WEN4)                        | 253.5  |       | 736.3  | mg/kg |              | 98% 25       |
| <b>B182474-PS1</b>  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 350.6  | 62.71 | 408.9  | mg/kg | 93% 75-125   |              |
|                     | Fe(WEN4)                        | 2401   | 62.71 | 2479   | mg/kg | 124% 75-125  |              |
|                     | Mn(WEN4)                        | 22.85  | 6.271 | 28.44  | mg/kg | 89% 75-125   |              |
|                     | Si(WEN4)                        | 253.5  | 627.1 | 799.4  | mg/kg | 87% 75-125   |              |
| <b>B182474-PS2</b>  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 350.6  | 62.71 | 356.5  | mg/kg | 10% 75-125   |              |
|                     | Fe(WEN4)                        | 2401   | 62.71 | 2428   | mg/kg | 43% 75-125   |              |
|                     | Mn(WEN4)                        | 22.85  | 6.271 | 23.15  | mg/kg | 5% 75-125    |              |
| <b>B182474-DUP2</b> | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 580.3  |       | 553.6  | mg/kg |              | 5% 25        |
|                     | Fe(WEN4)                        | 1235   |       | 1155   | mg/kg |              | 7% 25        |
|                     | Mn(WEN4)                        | 8.595  |       | 8.200  | mg/kg |              | 5% 25        |
|                     | Si(WEN4)                        | 522.5  |       | 495.8  | mg/kg |              | 5% 25        |
| <b>B182474-PS3</b>  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 580.3  | 62.73 | 638.3  | mg/kg | 92% 75-125   |              |
|                     | Fe(WEN4)                        | 1235   | 62.73 | 1292   | mg/kg | 90% 75-125   |              |
|                     | Mn(WEN4)                        | 8.595  | 6.273 | 14.64  | mg/kg | 96% 75-125   |              |
|                     | Si(WEN4)                        | 522.5  | 627.3 | 1061   | mg/kg | 86% 75-125   |              |
| <b>B182474-PS4</b>  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 580.3  | 62.73 | 642.0  | mg/kg | 98% 75-125   |              |
|                     | Fe(WEN4)                        | 1235   | 62.73 | 1309   | mg/kg | 118% 75-125  |              |
|                     | Mn(WEN4)                        | 8.595  | 6.273 | 14.73  | mg/kg | 98% 75-125   |              |
|                     | Si(WEN4)                        | 522.5  | 627.3 | 1059   | mg/kg | 86% 75-125   |              |



## Accuracy & Precision Summary

Batch: B182475  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182475-BS1  | <b>Blank Spike, (1841032)</b>   |        |       |        |       |              |              |
|              | Al(WEN5)  |        | 250.0 | 235.2  | mg/kg | 94% 75-125   |              |
|              | Fe(WEN5)  |        | 250.0 | 241.4  | mg/kg | 97% 75-125   |              |
|              | Mn(WEN5)  |        | 25.00 | 23.01  | mg/kg | 92% 75-125   |              |
| B182475-SRM2 | <b>Standard Reference Material (1805088, CRM052-50G Loamy Clay 1)</b> |        |       |        |       |              |              |
|              | Al(WEN5)  |        | 11500 | 9117   | mg/kg | 79% 75-125   |              |
|              | Fe(WEN5)  |        | 5090  | 4894   | mg/kg | 96% 75-125   |              |
|              | Mn(WEN5)  |        | 552.0 | 574.8  | mg/kg | 104% 75-125  |              |
|              | Si(WEN5)  |        | 795.0 | 260.9  | mg/kg | 33% 75-125   |              |
| B182475-DUP1 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Al(WEN5)  | 10610  |       | 12000  | mg/kg |              | 12% 25       |
|              | Si(WEN5)  | 55.79  |       | 65.28  | mg/kg |              | 16% 25       |
| B182475-DUP3 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Fe(WEN5)  | 14490  |       | 15680  | mg/kg |              | 8% 25        |
|              | Mn(WEN5)  | 229.3  |       | 214.1  | mg/kg |              | 7% 25        |
| B182475-PS1  | <b>Post Spike, (1837061-02)</b>                                       |        |       |        |       |              |              |
|              | Al(WEN5)  | 10610  | 125.4 | 10720  | mg/kg | 91% 75-125   |              |
|              | Si(WEN5)  | 55.79  | 1254  | 1165   | mg/kg | 88% 75-125   |              |
| B182475-PS2  | <b>Post Spike, (1837061-02)</b>                                       |        |       |        |       |              |              |
|              | Al(WEN5)  | 10610  | 125.4 | 10680  | mg/kg | 58% 75-125   |              |
|              | Si(WEN5)  | 55.79  | 1254  | 1177   | mg/kg | 89% 75-125   |              |
| B182475-PS5  | <b>Post Spike, (1837061-02)</b>                                       |        |       |        |       |              |              |
|              | Fe(WEN5)  | 14490  | 501.6 | 14900  | mg/kg | 83% 75-125   |              |
|              | Mn(WEN5)  | 229.3  | 50.16 | 280.4  | mg/kg | 102% 75-125  |              |
| B182475-PS6  | <b>Post Spike, (1837061-02)</b>                                       |        |       |        |       |              |              |
|              | Fe(WEN5)  | 14490  | 501.6 | 14830  | mg/kg | 68% 75-125   |              |
|              | Mn(WEN5)  | 229.3  | 50.16 | 280.6  | mg/kg | 102% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182475  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182475-DUP2 | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|              | Al(WEN5)                        | 9893   |       | 10510  | mg/kg |              | 6% 25        |
|              | Mn(WEN5)                        | 92.31  |       | 99.88  | mg/kg |              | 8% 25        |
|              | Si(WEN5)                        | 68.04  |       | 55.48  | mg/kg |              | 20% 25       |
| B182475-DUP4 | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|              | Fe(WEN5)                        | 12010  |       | 12520  | mg/kg |              | 4% 25        |
| B182475-PS3  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Al(WEN5)                        | 9893   | 125.5 | 10130  | mg/kg | 190% 75-125  |              |
|              | Mn(WEN5)                        | 92.31  | 12.55 | 104.4  | mg/kg | 96% 75-125   |              |
|              | Si(WEN5)                        | 68.04  | 1255  | 1180   | mg/kg | 89% 75-125   |              |
| B182475-PS4  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Al(WEN5)                        | 9893   | 125.5 | 10170  | mg/kg | 219% 75-125  |              |
|              | Mn(WEN5)                        | 92.31  | 12.55 | 104.5  | mg/kg | 97% 75-125   |              |
|              | Si(WEN5)                        | 68.04  | 1255  | 1170   | mg/kg | 88% 75-125   |              |
| B182475-PS7  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Fe(WEN5)                        | 12010  | 50190 | 58510  | mg/kg | 93% 75-125   |              |
| B182475-PS8  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Fe(WEN5)                        | 12010  | 50190 | 58900  | mg/kg | 93% 75-125   |              |



## Accuracy & Precision Summary

Batch: B182476  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182476-BS1  | <b>Blank Spike, (1844015)</b>   |        |       |        |       |              |              |
|              | Al(WEN6)  |        | 500.0 | 428.4  | mg/kg | 86% 75-125   |              |
|              | As(WEN6)  |        | 50.00 | 46.75  | mg/kg | 93% 75-125   |              |
|              | Fe(WEN6)  |        | 500.0 | 478.4  | mg/kg | 96% 75-125   |              |
|              | Mn(WEN6)  |        | 50.00 | 47.96  | mg/kg | 96% 75-125   |              |
| B182476-SRM2 | <b>Standard Reference Material (NC00391, NIST 2702 Inorganics in Marine Sediment)</b> |        |       |        |       |              |              |
|              | Al(WEN6)  |        | 84100 | 37860  | mg/kg | 45% 75-125   |              |
|              | As(WEN6)  |        | 45.30 | 38.03  | mg/kg | 84% 75-125   |              |
|              | Fe(WEN6)  |        | 79100 | 61640  | mg/kg | 78% 75-125   |              |
|              | Mn(WEN6)  |        | 1757  | 1434   | mg/kg | 82% 75-125   |              |
| B182476-DUP3 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Al(WEN6)  | 25910  |       | 16120  | mg/kg |              | 47% 25       |
|              | As(WEN6)  | ND     |       | ND     | mg/kg |              | N/C 25       |
|              | Fe(WEN6)  | 11140  |       | 17350  | mg/kg |              | 44% 25       |
|              | Mn(WEN6)  | 259.0  |       | 542.3  | mg/kg |              | 71% 25       |
| B182476-PS5  | <b>Post Spike, (1837061-02)</b>   |        |       |        |       |              |              |
|              | Al(WEN6)  | 25910  | 1003  | 26350  | mg/kg | 44% 75-125   |              |
|              | As(WEN6)  | ND     | 100.3 | 90.53  | mg/kg | 90% 75-125   |              |
|              | Fe(WEN6)  | 11140  | 1003  | 11830  | mg/kg | 69% 75-125   |              |
|              | Mn(WEN6)  | 259.0  | 100.3 | 355.0  | mg/kg | 96% 75-125   |              |
| B182476-PS6  | <b>Post Spike, (1837061-02)</b>   |        |       |        |       |              |              |
|              | Al(WEN6)  | 25910  | 1003  | 25910  | mg/kg | 0.7% 75-125  |              |
|              | As(WEN6)  | ND     | 100.3 | 90.84  | mg/kg | 91% 75-125   |              |
|              | Fe(WEN6)  | 11140  | 1003  | 11620  | mg/kg | 47% 75-125   |              |
|              | Mn(WEN6)  | 259.0  | 100.3 | 356.3  | mg/kg | 97% 75-125   |              |
| B182476-DUP4 | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|              | Al(WEN6)  | 21440  |       | 22040  | mg/kg |              | 3% 25        |
|              | As(WEN6)  | 23.93  |       | 23.94  | mg/kg |              | 0.03% 25     |
|              | Fe(WEN6)  | 10440  |       | 10210  | mg/kg |              | 2% 25        |
|              | Mn(WEN6)  | 182.1  |       | 177.0  | mg/kg |              | 3% 25        |



## Accuracy & Precision Summary

Batch: B182476  
Lab Matrix: Soil/Sediment  
Method: In-House

| Sample      | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182476-PS7 | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|             | Al(WEN6)                        | 21440  | 1004  | 22250  | mg/kg | 80% 75-125   |              |
|             | As(WEN6)                        | 23.93  | 100.4 | 112.8  | mg/kg | 89% 75-125   |              |
|             | Fe(WEN6)                        | 10440  | 1004  | 11270  | mg/kg | 82% 75-125   |              |
|             | Mn(WEN6)                        | 182.1  | 100.4 | 277.3  | mg/kg | 95% 75-125   |              |
| B182476-PS8 | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|             | Al(WEN6)                        | 21440  | 1004  | 22220  | mg/kg | 77% 75-125   |              |
|             | As(WEN6)                        | 23.93  | 100.4 | 113.3  | mg/kg | 89% 75-125   |              |
|             | Fe(WEN6)                        | 10440  | 1004  | 11280  | mg/kg | 84% 75-125   |              |
|             | Mn(WEN6)                        | 182.1  | 100.4 | 284.5  | mg/kg | 102% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182810  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182810-DUP1 | Duplicate, (1837061-02)<br>As(WEN2)  | 0.540  |       | 0.407  | mg/kg |              | 28% 25       |
| B182810-PS1  | Post Spike, (1837061-02)<br>As(WEN2) | 0.540  | 6.271 | 5.912  | mg/kg | 86% 75-125   |              |
| B182810-PS2  | Post Spike, (1837061-02)<br>As(WEN2) | 0.540  | 6.271 | 5.842  | mg/kg | 85% 75-125   |              |
| B182810-DUP2 | Duplicate, (1837061-06)<br>As(WEN2)  | 3964   |       | 4251   | mg/kg |              | 7% 25        |
| B182810-PS3  | Post Spike, (1837061-06)<br>As(WEN2) | 3964   | 1255  | 5497   | mg/kg | 122% 75-125  |              |
| B182810-PS4  | Post Spike, (1837061-06)<br>As(WEN2) | 3964   | 1255  | 5347   | mg/kg | 110% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182811  
Lab Matrix: Soil/Sediment  
Method: In-House

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182811-DUP2 | Duplicate, (1837061-06)<br>As(WEN3)  | 474.6  |       | 483.1  | mg/kg |              | 2% 25        |
| B182811-PS3  | Post Spike, (1837061-06)<br>As(WEN3) | 474.6  | 250.9 | 722.9  | mg/kg | 99% 75-125   |              |
| B182811-PS4  | Post Spike, (1837061-06)<br>As(WEN3) | 474.6  | 250.9 | 726.8  | mg/kg | 100% 75-125  |              |





## Accuracy & Precision Summary

Batch: B182812  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182812-DUP1 | Duplicate, (1837061-02)<br>As(WEN4)  | 0.878  |       | 0.565  | mg/kg |              | 43% 25       |
| B182812-PS1  | Post Spike, (1837061-02)<br>As(WEN4) | 0.878  | 6.271 | 6.697  | mg/kg | 93% 75-125   |              |
| B182812-PS2  | Post Spike, (1837061-02)<br>As(WEN4) | 0.878  | 6.271 | 6.886  | mg/kg | 96% 75-125   |              |
| B182812-DUP2 | Duplicate, (1837061-06)<br>As(WEN4)  | 111.3  |       | 102.3  | mg/kg |              | 8% 25        |
| B182812-PS3  | Post Spike, (1837061-06)<br>As(WEN4) | 111.3  | 25.09 | 137.5  | mg/kg | 104% 75-125  |              |
| B182812-PS4  | Post Spike, (1837061-06)<br>As(WEN4) | 111.3  | 25.09 | 142.7  | mg/kg | 125% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182813  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B182813-BS1  | Blank Spike, (1841032)<br>As(WEN5)   |        | 25.00 | 24.03  | mg/kg | 96% 75-125   |              |
| B182813-SRM2 | Standard Reference Material (1805088, CRM052-50G Loamy Clay 1)<br>As(WEN5) |        | 45.80 | 45.32  | mg/kg | 99% N/A      |              |
| B182813-DUP1 | Duplicate, (1837061-02)<br>As(WEN5)  | 1.941  |       | 1.453  | mg/kg |              | 29% 25       |
| B182813-PS1  | Post Spike, (1837061-02)<br>As(WEN5)                                       | 1.941  | 50.16 | 48.12  | mg/kg | 92% 75-125   |              |
| B182813-PS2  | Post Spike, (1837061-02)<br>As(WEN5)                                       | 1.941  | 50.16 | 49.26  | mg/kg | 94% 75-125   |              |
| B182813-DUP2 | Duplicate, (1837061-06)<br>As(WEN5)  | 1195   |       | 1171   | mg/kg |              | 2% 25        |
| B182813-PS3  | Post Spike, (1837061-06)<br>As(WEN5)                                       | 1195   | 5019  | 5800   | mg/kg | 92% 75-125   |              |
| B182813-PS4  | Post Spike, (1837061-06)<br>As(WEN5)                                       | 1195   | 5019  | 5853   | mg/kg | 93% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B182921  
**Lab Matrix:** Soil/Sediment  
**Method:** SM 2540G

| Sample       | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182921-DUP1 | Duplicate, (1837061-06)<br>%TS | 53.25  |       | 49.15  | %     |              | 8% 15        |



## Accuracy & Precision Summary

Batch: B182923  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte  | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|--------|--------|-------|--------------|--------------|
| B182923-BS2  | Blank Spike, (1806125)<br>Si(WEN6)   |        | 1000   | 791.2  | mg/kg | 79% 75-125   |              |
| B182923-SRM3 | Standard Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)<br>Si(WEN6) |        | 213000 | 202500 | mg/kg | 95% 75-125   |              |
| B182923-DUP1 | Duplicate, (1837061-02)<br>Si(WEN6)  | 306100 |        | 294300 | mg/kg |              | 4% 25        |
| B182923-PS1  | Post Spike, (1837061-02)<br>Si(WEN6)   | 306100 | 100300 | 398500 | mg/kg | 92% 75-125   |              |
| B182923-PS2  | Post Spike, (1837061-02)<br>Si(WEN6)   | 306100 | 100300 | 397000 | mg/kg | 91% 75-125   |              |
| B182923-DUP2 | Duplicate, (1837061-06)<br>Si(WEN6)  | 226400 |        | 221300 | mg/kg |              | 2% 25        |
| B182923-PS3  | Post Spike, (1837061-06)<br>Si(WEN6)   | 226400 | 100400 | 324800 | mg/kg | 98% 75-125   |              |
| B182923-PS4  | Post Spike, (1837061-06)<br>Si(WEN6)   | 226400 | 100400 | 320600 | mg/kg | 94% 75-125   |              |

**Project ID:** PTC-OA1701  
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BAL Report 1837061 R1  
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**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182466  
**Matrix:** Soil/Sediment  
**Method:** EPA 6020B Mod  
**Analyte:** As

| Sample       | Result | Units |
|--------------|--------|-------|
| B182466-BLK1 | 0.006  | mg/kg |
| B182466-BLK2 | 0.012  | mg/kg |
| B182466-BLK3 | 0.035  | mg/kg |
| B182466-BLK4 | 0.030  | mg/kg |

**Average:** 0.021  
**Limit:** 0.105

**MDL:** 0.045  
**MRL:** 0.105



## Method Blanks & Reporting Limits

**Batch:** B182472  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182472-BLK1    | 0.087        | mg/kg |                   |
| B182472-BLK2    | 0.062        | mg/kg |                   |
| B182472-BLK3    | 0.031        | mg/kg |                   |
| B182472-BLK4    | 0.107        | mg/kg |                   |
| <b>Average:</b> | <b>0.072</b> |       | <b>MDL: 0.175</b> |
| <b>Limit:</b>   | <b>0.325</b> |       | <b>MRL: 0.325</b> |

**Analyte:** Fe(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182472-BLK1    | 0.104        | mg/kg |                   |
| B182472-BLK2    | 0.266        | mg/kg |                   |
| B182472-BLK3    | 0.090        | mg/kg |                   |
| B182472-BLK4    | 0.132        | mg/kg |                   |
| <b>Average:</b> | <b>0.148</b> |       | <b>MDL: 0.400</b> |
| <b>Limit:</b>   | <b>0.775</b> |       | <b>MRL: 0.775</b> |

**Analyte:** Mn(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182472-BLK1    | 0.002        | mg/kg |                   |
| B182472-BLK2    | 0.0005       | mg/kg |                   |
| B182472-BLK3    | 0.001        | mg/kg |                   |
| B182472-BLK4    | 0.002        | mg/kg |                   |
| <b>Average:</b> | <b>0.001</b> |       | <b>MDL: 0.002</b> |
| <b>Limit:</b>   | <b>0.025</b> |       | <b>MRL: 0.025</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si(WEN2)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B182472-BLK1    | -0.528        | mg/kg        |                  |
| B182472-BLK2    | -0.872        | mg/kg        |                  |
| B182472-BLK3    | -0.796        | mg/kg        |                  |
| B182472-BLK4    | -0.857        | mg/kg        |                  |
| <b>Average:</b> | <b>-0.763</b> |              | <b>MDL: 1.25</b> |
| <b>Limit:</b>   | <b>2.500</b>  |              | <b>MRL: 2.50</b> |



## Method Blanks & Reporting Limits

**Batch:** B182473  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182473-BLK1    | 0.084        | mg/kg |                   |
| B182473-BLK2    | 0.037        | mg/kg |                   |
| B182473-BLK3    | 0.103        | mg/kg |                   |
| B182473-BLK4    | 0.005        | mg/kg |                   |
| <b>Average:</b> | <b>0.057</b> |       | <b>MDL: 0.200</b> |
| <b>Limit:</b>   | <b>0.375</b> |       | <b>MRL: 0.375</b> |

**Analyte:** As(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182473-BLK1    | 0.232        | mg/kg |                   |
| B182473-BLK2    | 0.226        | mg/kg |                   |
| B182473-BLK3    | 0.224        | mg/kg |                   |
| B182473-BLK4    | 0.223        | mg/kg |                   |
| <b>Average:</b> | <b>0.226</b> |       | <b>MDL: 0.250</b> |
| <b>Limit:</b>   | <b>0.500</b> |       | <b>MRL: 0.500</b> |

**Analyte:** Fe(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182473-BLK1    | 0.477        | mg/kg |                   |
| B182473-BLK2    | 0.464        | mg/kg |                   |
| B182473-BLK3    | 0.465        | mg/kg |                   |
| B182473-BLK4    | 0.482        | mg/kg |                   |
| <b>Average:</b> | <b>0.472</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>1.000</b> |       | <b>MRL: 1.00</b>  |





## Method Blanks & Reporting Limits

**Analyte:** Mn(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182473-BLK1    | 0.111        | mg/kg |                   |
| B182473-BLK2    | 0.109        | mg/kg |                   |
| B182473-BLK3    | 0.112        | mg/kg |                   |
| B182473-BLK4    | 0.112        | mg/kg |                   |
| <b>Average:</b> | <b>0.111</b> |       | <b>MDL: 0.125</b> |
| <b>Limit:</b>   | <b>0.225</b> |       | <b>MRL: 0.225</b> |

**Analyte:** Si(WEN3)

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B182473-BLK1    | -1.40         | mg/kg |                  |
| B182473-BLK2    | -1.38         | mg/kg |                  |
| B182473-BLK3    | -1.38         | mg/kg |                  |
| B182473-BLK4    | -1.29         | mg/kg |                  |
| <b>Average:</b> | <b>-1.364</b> |       | <b>MDL: 1.50</b> |
| <b>Limit:</b>   | <b>3.000</b>  |       | <b>MRL: 3.00</b> |



## Method Blanks & Reporting Limits

**Batch:** B182474  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182474-BLK1    | 0.035        | mg/kg |                   |
| B182474-BLK2    | 0.295        | mg/kg |                   |
| B182474-BLK3    | 0.041        | mg/kg |                   |
| B182474-BLK4    | 0.033        | mg/kg |                   |
| <b>Average:</b> | <b>0.101</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>1.000</b> |       | <b>MRL: 1.00</b>  |

**Analyte:** Fe(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182474-BLK1    | 0.521        | mg/kg |                   |
| B182474-BLK2    | 0.534        | mg/kg |                   |
| B182474-BLK3    | 0.508        | mg/kg |                   |
| B182474-BLK4    | 0.482        | mg/kg |                   |
| <b>Average:</b> | <b>0.511</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>1.250</b> |       | <b>MRL: 1.25</b>  |

**Analyte:** Mn(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182474-BLK1    | 0.097        | mg/kg |                   |
| B182474-BLK2    | 0.097        | mg/kg |                   |
| B182474-BLK3    | 0.099        | mg/kg |                   |
| B182474-BLK4    | 0.097        | mg/kg |                   |
| <b>Average:</b> | <b>0.098</b> |       | <b>MDL: 0.100</b> |
| <b>Limit:</b>   | <b>0.200</b> |       | <b>MRL: 0.200</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si(WEN4)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B182474-BLK1    | -1.34         | mg/kg        |                  |
| B182474-BLK2    | -1.24         | mg/kg        |                  |
| B182474-BLK3    | -1.36         | mg/kg        |                  |
| B182474-BLK4    | -1.46         | mg/kg        |                  |
| <b>Average:</b> | <b>-1.349</b> |              | <b>MDL: 1.62</b> |
| <b>Limit:</b>   | <b>3.250</b>  |              | <b>MRL: 3.25</b> |



## Method Blanks & Reporting Limits

**Batch:** B182475  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN5)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182475-BLK1    | 0.128  | mg/kg |                   |
| B182475-BLK2    | 0.023  | mg/kg |                   |
| B182475-BLK3    | 2.84   | mg/kg |                   |
| B182475-BLK4    | 0.262  | mg/kg |                   |
| <b>Average:</b> | 0.814  |       | <b>MDL:</b> 0.500 |
| <b>Limit:</b>   | 1.000  |       | <b>MRL:</b> 1.00  |

**Analyte:** Fe(WEN5)

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B182475-BLK1    | 3.74   | mg/kg |                  |
| B182475-BLK2    | 0.129  | mg/kg |                  |
| B182475-BLK3    | 5.08   | mg/kg |                  |
| B182475-BLK4    | 0.176  | mg/kg |                  |
| <b>Average:</b> | 2.283  |       | <b>MDL:</b> 10.0 |
| <b>Limit:</b>   | 20.000 |       | <b>MRL:</b> 20.0 |

**Analyte:** Mn(WEN5)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182475-BLK1    | 0.035  | mg/kg |                   |
| B182475-BLK2    | 0.005  | mg/kg |                   |
| B182475-BLK3    | 0.004  | mg/kg |                   |
| B182475-BLK4    | 0.004  | mg/kg |                   |
| <b>Average:</b> | 0.012  |       | <b>MDL:</b> 0.050 |
| <b>Limit:</b>   | 0.125  |       | <b>MRL:</b> 0.125 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si(WEN5)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B182475-BLK1    | -2.83         | mg/kg        |                  |
| B182475-BLK2    | -2.37         | mg/kg        |                  |
| B182475-BLK3    | -2.40         | mg/kg        |                  |
| B182475-BLK4    | -1.89         | mg/kg        |                  |
| <b>Average:</b> | <b>-2.370</b> |              | <b>MDL: 3.50</b> |
| <b>Limit:</b>   | <b>7.000</b>  |              | <b>MRL: 7.00</b> |



## Method Blanks & Reporting Limits

**Batch:** B182476  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN6)

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B182476-BLK1    | 2.20          | mg/kg |                  |
| B182476-BLK2    | 3.94          | mg/kg |                  |
| B182476-BLK3    | 1.75          | mg/kg |                  |
| B182476-BLK4    | 1.64          | mg/kg |                  |
| <b>Average:</b> | <b>2.382</b>  |       | <b>MDL:</b> 12.5 |
| <b>Limit:</b>   | <b>25.000</b> |       | <b>MRL:</b> 25.0 |

**Analyte:** As(WEN6)

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B182476-BLK1    | 0.385        | mg/kg |                  |
| B182476-BLK2    | 0.429        | mg/kg |                  |
| B182476-BLK3    | 0.466        | mg/kg |                  |
| B182476-BLK4    | 0.485        | mg/kg |                  |
| <b>Average:</b> | <b>0.441</b> |       | <b>MDL:</b> 1.00 |
| <b>Limit:</b>   | <b>2.500</b> |       | <b>MRL:</b> 2.50 |

**Analyte:** Fe(WEN6)

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B182476-BLK1    | 0.637         | mg/kg |                  |
| B182476-BLK2    | 1.79          | mg/kg |                  |
| B182476-BLK3    | 0.427         | mg/kg |                  |
| B182476-BLK4    | 20.2          | mg/kg |                  |
| <b>Average:</b> | <b>5.761</b>  |       | <b>MDL:</b> 6.50 |
| <b>Limit:</b>   | <b>12.500</b> |       | <b>MRL:</b> 12.5 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Mn(WEN6)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B182476-BLK1    | 0.004         | mg/kg        |                   |
| B182476-BLK2    | 0.019         | mg/kg        |                   |
| B182476-BLK3    | 0.001         | mg/kg        |                   |
| B182476-BLK4    | 0.046         | mg/kg        |                   |
| <b>Average:</b> | <b>0.018</b>  |              | <b>MDL:</b> 0.150 |
| <b>Limit:</b>   | <b>0.300</b>  |              | <b>MRL:</b> 0.300 |

**Project ID:** PTC-OA1701  
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BAL Report 1837061 R1  
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**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182810  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN2)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182810-BLK1    | 0.008  | mg/kg |                   |
| B182810-BLK2    | 0.005  | mg/kg |                   |
| B182810-BLK3    | 0.040  | mg/kg |                   |
| B182810-BLK4    | 0.008  | mg/kg |                   |
| <b>Average:</b> | 0.015  |       | <b>MDL:</b> 0.075 |
| <b>Limit:</b>   | 0.125  |       | <b>MRL:</b> 0.125 |



**Project ID:** PTC-OA1701  
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BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182811  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN3)

| Sample       | Result | Units |
|--------------|--------|-------|
| B182811-BLK1 | 0.009  | mg/kg |
| B182811-BLK2 | 0.006  | mg/kg |
| B182811-BLK3 | 0.005  | mg/kg |
| B182811-BLK4 | 0.007  | mg/kg |

**Average:** 0.007  
**Limit:** 0.025

**MDL:** 0.012  
**MRL:** 0.025

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182812  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN4)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182812-BLK1    | 0.022  | mg/kg |                   |
| B182812-BLK2    | 0.097  | mg/kg |                   |
| B182812-BLK3    | 0.165  | mg/kg |                   |
| B182812-BLK4    | 0.216  | mg/kg |                   |
| <b>Average:</b> | 0.125  |       | <b>MDL:</b> 0.375 |
| <b>Limit:</b>   | 0.750  |       | <b>MRL:</b> 0.750 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182813  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN5)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182813-BLK1    | 0.209  | mg/kg |                   |
| B182813-BLK2    | 0.148  | mg/kg |                   |
| B182813-BLK3    | 0.130  | mg/kg |                   |
| B182813-BLK4    | 0.114  | mg/kg |                   |
| <b>Average:</b> | 0.150  |       | <b>MDL:</b> 0.275 |
| <b>Limit:</b>   | 0.550  |       | <b>MRL:</b> 0.550 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182921  
**Matrix:** Soil/Sediment  
**Method:** SM 2540G  
**Analyte:** %TS

| Sample       | Result | Units |
|--------------|--------|-------|
| B182921-BLK1 | 0.00   | %     |
| B182921-BLK2 | 0.00   | %     |

**Average:** 0.00  
**Limit:** 0.02

**MDL:** 0.005  
**MRL:** 0.02

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182923  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Si(WEN6)

| Sample       | Result | Units |
|--------------|--------|-------|
| B182923-BLK1 | 1.69   | mg/kg |
| B182923-BLK2 | -1.20  | mg/kg |
| B182923-BLK3 | -11.9  | mg/kg |
| B182923-BLK4 | -9.98  | mg/kg |

**Average:** -5.349  
**Limit:** 48.000

**MDL:** 24.0  
**MRL:** 48.0

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|  |                  |             |                                |                     |              |                              |                    |
|--|------------------|-------------|--------------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1837061-01                      |                  |             | <b>Report Matrix:</b> Sediment |                     |              | <b>Collected:</b> 09/12/2018 |                    |
| <b>Sample:</b> SD-125+00-ST1-SED-091218-0-0.33 |                  |             | <b>Sample Type:</b> Sample     |                     |              | <b>Received:</b> 09/14/2018  |                    |
| <b>Des</b>                                     | <b>Container</b> | <b>Size</b> | <b>Lot</b>                     | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Client-Provided  | n/a         | n/a                            | none                | n/a          |                              | Cooler - 1837061   |
| B  | EXTRA_VOL        | n/a         | n/a                            | none                | n/a          |                              | Cooler - 1837061   |

|  |                  |             |                                |                     |              |                              |                    |
|--|------------------|-------------|--------------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Lab ID:</b> 1837061-02                    |                  |             | <b>Report Matrix:</b> Sediment |                     |              | <b>Collected:</b> 09/12/2018 |                    |
| <b>Sample:</b> SD-125+50-0-SED-091218-0-0.33 |                  |             | <b>Sample Type:</b> Sample     |                     |              | <b>Received:</b> 09/14/2018  |                    |
| <b>Des</b>                                   | <b>Container</b> | <b>Size</b> | <b>Lot</b>                     | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Client-Provided  | n/a         | n/a                            | none                | n/a          |                              | Cooler - 1837061   |
| B  | EXTRA_VOL        | n/a         | n/a                            | none                | n/a          |                              | Cooler - 1837061   |

Comments: Field ID changed from SD-125+00-0-SED-091218-0-0.33 to SD-125+50-0-SED-091218-0-0.33, per client request. --JSM 11/15/2018

|   |                  |             |                            |                     |              |                              |                     |
|---|------------------|-------------|----------------------------|---------------------|--------------|------------------------------|---------------------|
| <b>Lab ID:</b> 1837061-03                 |                  |             | <b>Report Matrix:</b> Soil |                     |              | <b>Collected:</b> 09/18/2018 |                     |
| <b>Sample:</b> SO-PTC-122-091818-9.5-10.5 |                  |             | <b>Sample Type:</b> Sample |                     |              | <b>Received:</b> 09/18/2018  |                     |
| <b>Des</b>                                | <b>Container</b> | <b>Size</b> | <b>Lot</b>                 | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A   | Client-Provided  | n/a         | n/a                        | none                | n/a          |                              | Cooler #2 - 1837061 |

|  |                  |             |                            |                     |              |                              |                     |
|--|------------------|-------------|----------------------------|---------------------|--------------|------------------------------|---------------------|
| <b>Lab ID:</b> 1837061-04                  |                  |             | <b>Report Matrix:</b> Soil |                     |              | <b>Collected:</b> 09/18/2018 |                     |
| <b>Sample:</b> SO-PTC-127-091818-17.0-17.5 |                  |             | <b>Sample Type:</b> Sample |                     |              | <b>Received:</b> 09/18/2018  |                     |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b> | <b>Lot</b>                 | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A  | Client-Provided  | n/a         | n/a                        | none                | n/a          |                              | Cooler #2 - 1837061 |

|  |                  |             |                            |                     |              |                              |                     |
|--|------------------|-------------|----------------------------|---------------------|--------------|------------------------------|---------------------|
| <b>Lab ID:</b> 1837061-05                  |                  |             | <b>Report Matrix:</b> So   |                     |              | <b>Collected:</b> 09/20/2018 |                     |
| <b>Sample:</b> SO-PTC-112-092018-17.0-18.0 |                  |             | <b>Sample Type:</b> Sample |                     |              | <b>Received:</b> 09/21/2018  |                     |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b> | <b>Lot</b>                 | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b>  |
| A  | Client-Provided  | n/a         | n/a                        | none                | n/a          |                              | Cooler #3 - 1837061 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1837061 R1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|  |                    |                   |   |                     |  |
|--|--------------------|-------------------|---|---------------------|--|
| <b>Lab ID:</b> 1837061-06<br><b>Sample:</b> SO-PTC-104-092018-14.2-14.7<br><b>Des Container</b><br>A Client-Provided | <b>Size</b><br>n/a | <b>Lot</b><br>n/a | <b>Report Matrix:</b> So<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/20/2018<br><b>Received:</b> 09/21/2018<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler #3 -<br>1837061 |
| <b>Lab ID:</b> 1837061-07<br><b>Sample:</b> SO-PTC-120-092118-11.0-12.0<br><b>Des Container</b><br>A Client-Provided | <b>Size</b><br>n/a | <b>Lot</b><br>n/a | <b>Report Matrix:</b> So<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/21/2018<br><b>Received:</b> 09/21/2018<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler #3 -<br>1837061 |
| <b>Lab ID:</b> 1837061-08<br><b>Sample:</b> SO-PTC-108-092118-13.2-14.2<br><b>Des Container</b><br>A Client-Provided | <b>Size</b><br>n/a | <b>Lot</b><br>n/a | <b>Report Matrix:</b> So<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/21/2018<br><b>Received:</b> 09/21/2018<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler #3 -<br>1837061 |



## Shipping Containers

### Cooler - 1837061

**Received:** September 14, 2018 13:35  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Dry Ice  
**Temperature:** -1.7 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#17

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes

### Cooler #2 - 1837061

**Received:** September 18, 2018 15:20  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Dry Ice  
**Temperature:** -22.0 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#15

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes

### Cooler #3 - 1837061

**Received:** September 21, 2018 15:00  
**Tracking No:** n/a via Customer Drop-Off  
**Coolant Type:** Dry Ice  
**Temperature:** 2.3 °C

**Description:** Cooler #3  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR#18

**Custody seals present?** Yes  
**Custody seals intact?** Yes  
**COC present?** Yes





# Chain-of-Custody Form

BAL Report 1837061 R1

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: [Signature] For BAL use only Date: 9/14/18

Work Order ID: 1837061 Time: 13:35

Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)  |                                 | Collection           |      | Client Sample Info |                      |                           |                   | BAL Analyses Required  |   |   |                                      |              |       |  | Comments |  |  |  |  |  |                     |  |
|--|---------------------------------|----------------------|------|--------------------|----------------------|---------------------------|-------------------|--|---|---|--------------------------------------|--------------|-------|--|----------|--|--|--|--|--|---------------------|--|
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ |                                 | Date                 | Time | Matrix Type        | Number of Containers | Field Filtered?           | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |              |       |  |          |  |  |  |  |  |                     |  |
| *Surcharges may apply to expedited TATs  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      | Specify Here |       |  |          |  |  |  |  |  |                     |  |
| Sample ID  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| 1  | SD-125+00-ST1-SED-091218-0-0.33 | 09/12/18             | 1230 | Sediment           | 2                    |                           | Other             | ✓  | ✓   |   |                                      |              |       |  |          |  |  |  |  |  | Anoxic Preservation |  |
| 2  | SD-125+00-0-SED-091218-0-0.33   | 09/12/18             | 1300 | Sediment           | 2                    |                           | Other             | ✓  | ✓   |   |                                      |              |       |  |          |  |  |  |  |  | Anoxic Preservation |  |
| 3  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| 4  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| 5  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| 6  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| 7  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| 8  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| 9  |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| 10   |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| Trip Blank (specify)   |                                 |                      |      |                    |                      |                           |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |
| Relinquished By: <u>[Signature]</u>  |                                 | Date: <u>9/14/18</u> |      | Time: <u>1315</u>  |                      | Relinquished By:          |                   |  |   |   | Date:                                |              | Time: |  |          |  |  |  |  |  |                     |  |
| Received By: <u>[Signature]</u>  |                                 | Date: <u>9/14/18</u> |      | Time: <u>1315</u>  |                      | Total Number of Packages: |                   |  |   |   |                                      |              |       |  |          |  |  |  |  |  |                     |  |

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# Chain-of-Custody Form

BAL Report 1837061 R1

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: [Signature] For BAL use only Date: 9/18/18  
Work Order ID: \_\_\_\_\_ Time: 15:20  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Samples Collected By: DG Cooper (DOF) 206-660-3466  
Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection           |                             | Client Sample Info |                      |                 |                           | BAL Analyses Required  |   |   |                                      |  |       | Comments |              |                  |
|--|----------------------|-----------------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|--------------------------------------|--|-------|----------|--------------|------------------|
|  | Date                 | Time                        | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |  |       |          |              |                  |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID            |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          | Specify Here |                  |
|  | 1                    | SO-PTC-122-091818-9.5.10.5  | 9/18/18            | 1000                 | SOIL            | 1                         | NA   | NA  | X   |                                      |  |       |          |              | ANOXIC PRESERVED |
|  | 2                    | SO-PTC-127-091818-17.0-17.5 | 9/18/18            | 1230                 | SOIL            | 1                         | NA   | NA  | X   |                                      |  |       |          |              | "                |
|  | 3                    |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
|  | 4                    |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
|  | 5                    |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
|  | 6                    |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
|  | 7                    |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
|  | 8                    |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
|  | 9                    |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
|  | 10                   |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
|  | Trip Blank (specify) |                             |                    |                      |                 |                           |  |   |   |                                      |  |       |          |              |                  |
| Relinquished By: <u>EZEA BEAVER</u>  |                      | Date: <u>9/18/18</u>        |                    | Time: <u>15:20</u>   |                 | Relinquished By:          |  |   |   | Date:                                |  | Time: |          |              |                  |
| Received By:   |                      | Date:                       |                    | Time:                |                 | Total Number of Packages: |  |   |   |                                      |  |       |          |              |                  |

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**BROOKS**

# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: Justin For BAL use only Date: 9/18/18  
Work Order ID: \_\_\_\_\_ Time: 15:20  
Project ID: \_\_\_\_\_

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
Samples Collected By: DG Cooper (DOF) 206-660-3466

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

Special instructions for lab: special preservation for soil/sediment samples.  
Substrate: DDDO PIONEER using DDDO PPE FDD 1.2.2.1

| Requested TAT (business days)  |                             | Collection |      | Client Sample Info |                      |                 |                   | BAL Analyses Required  |   |   |                                      |  |  | Comments |  |                    |
|--|-----------------------------|------------|------|--------------------|----------------------|-----------------|-------------------|--|---|---|--------------------------------------|--|--|----------|--|--------------------|
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ |                             | Date       | Time | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-6 (including Footnote 2) | Solid: Total recoverable As by 5020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |  |  |          |  | Specify Here       |
| *Surcharges may apply to expedited TATs  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| Sample ID  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| 1  | 50-PTC-122-091818-9.5-10.5  | 9/18/18    | 1000 | SOIL               | 1                    | NA              | NA                | X  | X   |   |                                      |  |  |          |  | ANALYSIS PRESERVED |
| 2  | 50-PTC-127-091818-17.6-17.5 | 9/18/18    | 1230 | SOIL               | 1                    | NA              | NA                | X  | X   |   |                                      |  |  |          |  | "                  |
| 3  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| 4  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| 5  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| 6  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| 7  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| 8  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| 9  |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| 10   |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |
| Trip Blank (specify)   |                             |            |      |                    |                      |                 |                   |  |   |   |                                      |  |  |          |  |                    |

|                                     |                      |                    |                                 |             |             |
|-------------------------------------|----------------------|--------------------|---------------------------------|-------------|-------------|
| Relinquished By: <u>Ezra Beaver</u> | Date: <u>9/18/18</u> | Time: <u>15:20</u> | Relinquished By: _____          | Date: _____ | Time: _____ |
| Received By: _____                  | Date: _____          | Time: _____        | Total Number of Packages: _____ |             |             |

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# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: Alyssa Kuhn For BAL use only Date: 9/21/18

Work Order ID: \_\_\_\_\_ Time: 1500

Project ID: \_\_\_\_\_

Mail Invoice to:

Mail Report to:

Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes

BAL PM: Jeremy Maute

Client: Port of Tacoma (PIONEER/DOF)

PO Number: 79224

Contact: Troy Bussey (PIONEER)

Phone: 360-570-1700

Client Project ID: Arkema FS DG Inv

Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

| Requested TAT (business days)  |                             | Collection           |      | Client Sample Info |                      |                                 |                   | BAL Analyses Required  |   |   |                                      |             |  | Comments |  |                     |
|--|-----------------------------|----------------------|------|--------------------|----------------------|---------------------------------|-------------------|--|---|---|--------------------------------------|-------------|--|----------|--|---------------------|
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ |                             | Date                 | Time | Matrix Type        | Number of Containers | Field Filtered?                 | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Note: Field conductivity measurement |             |  |          |  | Specify Here        |
| *Surcharges may apply to expedited TATs  |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| Sample ID  |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| 1  | SO-PTC-112-092018-17.0-18.0 | 9/20/18              | 1410 | SO                 | 1-8oz                | NA                              | -                 | X  | X   |   |                                      |             |  |          |  | ANOXIC PRESERVATION |
| 2  | SO-PTC-104-092018-14.2-14.7 | 9/20/18              | 1600 | SO                 | 1-8oz                | NA                              | -                 | X  | X   |   |                                      |             |  |          |  | ANOXIC PRESERVATION |
| 3  | SO-PTC-120-092118-11.0-12.0 | 9/21/18              | 0945 | SO                 | 1-8oz                | NA                              | -                 | X  | X   |   |                                      |             |  |          |  | ANOXIC PRESERVATION |
| 4  | SO-PTC-108-092118-13.2-14.2 | 9/21/18              | 1100 | SO                 | 1-8oz                | NA                              | -                 | X  | X   |   |                                      |             |  |          |  | ANOXIC PRESERVATION |
| 5  |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| 6  |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| 7  |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| 8  |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| 9  |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| 10   |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| Trip Blank (specify)   |                             |                      |      |                    |                      |                                 |                   |  |   |   |                                      |             |  |          |  |                     |
| Relinquished By: <u>[Signature]</u>  |                             | Date: <u>9/21/18</u> |      | Time: <u>1300</u>  |                      | Relinquished By: _____          |                   |  |   | Date: _____   |                                      | Time: _____ |  |          |  |                     |
| Received By: <u>THUSIA DOG WONG</u>  |                             | Date: <u>9/21/18</u> |      | Time: <u>1300</u>  |                      | Total Number of Packages: _____ |                   |  |   |   |                                      |             |  |          |  |                     |

Page 1 of 1

List Hazardous Contaminants: \_\_\_\_\_

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18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

November 13, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On September 21, 2017 through October 6, 2017, Brooks Applied Labs (BAL) received thirteen (13) soil samples. At the request of the client, three (3) soil samples were removed from storage and logged in for %TS and total recoverable arsenic [As] analysis. Additionally, a five-step selective sequential extraction (SSE) method, based on *Wenzel et al.*, was employed for correlation between metals (aluminum [Al], arsenic [As], iron [Fe], manganese [Mn], and silicon [Si]) and different substrate properties. This report only contains the results for the three samples selected for these analyses.

All samples were stored and prepped anoxically in an oxygen free glove box. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

Shortly after receipt, all submitted core samples were unpacked in a glove box maintained under anoxic conditions, split into appropriate sample containers, and then stored according to BAL SOPs. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

### **Total Solids Analysis**

#### **Batch B182467**

A known mass of each soil sample was placed into a pre-weighed pan, then the combined mass of the sample and pan was recorded. All samples were placed into a convection oven maintained at a temperature of 105°C. After drying for a minimum of forty-eight (48) hours, all samples were briefly cooled and reweighed. The total solids percentage of each sample was calculated by dividing the weight of the dried sample by the weight of the original sample.

### **Total Recoverable Arsenic Quantitation by ICP-QQQ-MS**

Total recoverable arsenic quantitation was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Prior to analysis a known mass of each sample was digested with aliquots of concentrated HNO<sub>3</sub> and H<sub>2</sub>O<sub>2</sub> in a hot block apparatus, in accordance with a modified EPA Method 3050B.

#### **Batch B182466**

The method for total recoverable arsenic (EPA 6020B Mod) requires that samples are digested within one (1) year from the date of sample collection. The samples in this sample delivery group were collected between the dates of September 15, 2017 and October 4, 2017. The samples were digested on October

11, 2018, violating the holding time criteria. Consequently, all total recoverable arsenic results (EPA 6020B Mod) should be considered estimated and have been qualified “H” due to holding time violations.

The total metals results were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values and MRL values are determined by MDL studies. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample concentration, the recoveries and the relative percent difference (RPD) are not considered valid indicators of data quality. In such instances, the recoveries of the laboratory fortified blanks (BS) and/or standard reference materials (SRM) demonstrate the accuracy of the applied methods. When the spiking level was less than 25% of the native sample concentration, the spike recovery was not reported (NR) and the relative percent difference (RPD) of the MS/MSD set was not calculated (N/C).

### **Al, As, Fe, Mn, and Si (Five Step SSE (Wenzel et al.)) Quantitation by ICP-QQQ-MS**

Metals quantitation ([Al], [As], [Fe], [Mn], and [Si]) was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). Prior to the analyses, a sequential extraction method, based on *Wenzel et al.*, was employed. The applied extraction solutions are designed to target the different substrate components. The following table provides details on the various fractions in the Five Step SSE (*Wenzel et al.*). At the request of the client, step one Five Step SSE (*Wenzel et al.*) of the extraction is not used in for this project. Consequently, the table begins with step two of the SSE.

#### **Five Step SSE (Wenzel et al.)**

| <b>SSE Extraction Step</b> | <b>Analyte Code</b> | <b>Extraction Liquid Identity</b>                                       | <b>Volume Extraction Liquid (mL)</b> | <b>Target Fraction/Substrate Description</b> |
|----------------------------|---------------------|---|--------------------------------------|--|
| 2                          | xx(WEN2)            | 0.05 M (NH <sub>4</sub> ) H <sub>2</sub> PO <sub>4</sub>                | 25                                   | Specifically-sorbed metals                   |
| 3                          | xx(WEN3)            | 0.2M ammonium oxalate buffer (pH=3.25)                                  | 25                                   | Amorphous metal oxyhydroxides                |
| 4                          | xx(WEN4)            | 0.2M ammonium oxalate buffer + 0.1M Ascorbic Acid                       | 25                                   | Crystalline metal oxyhydroxides              |
| 5                          | xx(WEN5)            | concentrated HNO <sub>3</sub> , H <sub>2</sub> O <sub>2</sub> , and HCl | 50                                   | Residual, Total Recoverable                  |
| 6                          | xx(WEN6)            | concentrated HNO <sub>3</sub> , HCl, and HF                             | 50                                   | Residual, Total digest                       |

Approximately 1g of each soil sample was transferred to a 50mL polypropylene vial and exactly 25mL of 0.05 M NH<sub>4</sub>H<sub>2</sub>PO<sub>4</sub> was added to each vial. Each vial was capped and shaken on an inverting shaker for 16 hours at room temperature at 30 RPM.



The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN2", the WEN2 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 20mL of reagent water was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

All sample vials were wrapped in aluminum foil to prevent photo-oxidation and exactly 25mL of 0.2M ammonium oxalate buffer (pH=3.25) was added to each vial. Each vial was capped and shaken on an inverting shaker for 4 hours at room temperature at 30 RPM.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN3", the WEN3 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 12.5mL of ammonium oxalate buffer was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

Exactly 25mL of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were then placed in a hotblock digestion apparatus at 96°C for 30 minutes.

The samples were removed from the shaker and centrifuged for 20 minutes at 3000RPM. After the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN4", the WEN4 fraction was preserved (1% HNO<sub>3</sub> vol/vol). A total of 12.5mL of 0.2M ammonium oxalate buffer with 0.1M ascorbic acid was added to each vial. The vials were shaken vigorously and centrifuged for 20 minutes at 3000RPM. The supernatant was decanted and discarded.

The residual solid pellets remaining in the vials were then digested with aliquots of concentrated HNO<sub>3</sub>, HCl, and H<sub>2</sub>O<sub>2</sub> (in accordance with a modified EPA Method 3050B). The samples were removed from the hot block apparatus and allowed to cool. The samples were centrifuged for 20 minutes at 3000RPM. Afterward, the supernatant was decanted into a separate vial for trace metals analysis and labeled "WEN5".

The residual solid pellets remaining in the vials were then digested in a closed vessel (bomb) with concentrated nitric, hydrochloric, and hydrofluoric acids, in accordance with a modified EPA Method 3052. The resulting digests were labeled "WEN6".

All samples were stored and prepped anoxically in an oxygen free glove box. Degassed reagent water was used to prepare extraction solutions for each step, except for steps 5 and 6 (i.e. residual metals fractions). For each fraction requiring an inverting rotator, the tumbling step took place in an anoxic environment (glovebox).

Total recoverable metals quantitation on individual fractions was performed by inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website, [brooksapplied.com](http://brooksapplied.com).

#### Batch B182472 (WEN2 analyses)

The analyst noted some precipitate in the extracts from the Wenzel step two. An additional step was employed at the instrument, where the analyst added concentrated HNO<sub>3</sub> to the extracts prior to adding the diluent. The samples were allowed to sit for a few minutes before adding the diluent. Any precipitates observed were solubilized upon the addition of the concentrated acid.

The relative percent difference (RPD) value for aluminum in the laboratory duplicate sample, B182472-DUP1, was greater than the control limit of 25%, at 51%. Re-analysis confirmed the result. The aluminum result for the source sample, 1837061-02, should be considered estimated due to poor precision, and

has been qualified "M". The source sample for this QC sample is from a separate work order (Batch QC). No data from this work order were qualified based on the RPD outlier.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182810 (WEN2 analyses)

The analyst noted some precipitate in the extracts from the Wenzel step two. An additional step was employed at the instrument, where the analyst added concentrated HNO<sub>3</sub> to the extracts prior to adding the diluent. The samples were allowed to sit for a few minutes before adding the diluent. Any precipitates observed were solubilized upon the addition of the concentrated acid.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182473 (WEN3 analyses)

The RPD value for iron in the laboratory duplicate sample, B182473-DUP1, was greater than the control limit of 25%, at 43%. The RPD value for manganese in the laboratory duplicate sample, B182473-DUP3, was greater than the control limit of 25%, at 82%. Re-analyses confirmed the results. The iron and manganese results for the source sample, 1837061-02, should be considered estimated due to poor precision, and has been qualified "M". The source sample for this QC sample is from a separate work order (Batch QC). No data from this work order were qualified based on the RPD outlier

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.



In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182811 (WEN3 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182474 (WEN4 analyses)

The RPD values for iron, manganese, and silicon in the laboratory duplicate sample, B182474-DUP1, were greater than the control limit of 25%, at 26%, 43%, and 98%, respectively. Re-analysis confirmed the results. The iron, manganese, and silicon results for the source sample, 1837061-02, should be considered estimated due to poor precision, and have been qualified "M". The source sample for this QC sample is from a separate work order (Batch QC). No data from this work order were qualified based on the RPD outlier

The analyst determined that B182474-PS2 was not spiked at the instrument. Consequently, results for B182474-PS2 are not reported.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOP(s) and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182812 (WEN4 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to

account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182475 (WEN5 analyses)

The aluminum result for the third method blank, identified as B182475-BLK3, is a statistical outlier according to the Grubb's Test. The value for this sample was omitted from calculations used to determine the MDL associated with aluminum results. All results associated with the aluminum method blank outlier were greater than ten times the elevated method blank value. The method blank outlier should have no impact on data quality. No data were qualified based on the elevated aluminum result in B182475-BLK3.

The silicon spike recovery for the reference material sample, B182475-SRM4, is less than the lower control limit of 75% (at 44%). Re-analyses confirmed the result. All silicon results in Batch B182475 should be considered estimated and have been qualified "J-1" to indicate a potential low bias.

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182813 (WEN5 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a

demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182476 (WEN6 analyses)

The aluminum spike recovery for the reference material sample, B182476-SRM2, is less than the lower control limit of 45% (at 68%). Re-analyses confirmed the result. All aluminum results in Batch B182476 should be considered estimated and have been qualified "J-1" to indicate a potential low bias.

The iron result for the first method blank, identified as B182476-BLK1, is a statistical outlier according to the Grubb's Test. The value for this sample was omitted from calculations used to determine the MDL associated with aluminum results. All results associated with the iron method blank outlier were greater than ten times the elevated method blank value. The method blank outlier should have no impact on data quality. No data were qualified based on the elevated iron result in B182476-BLK1.

The RPD values for aluminum, iron, and manganese in the laboratory duplicate sample, B182476-DUP3, were greater than the control limit of 25%, at 47%, 44%, and 71%, respectively. Re-analysis confirmed the results. The aluminum, iron, and manganese results for the source sample, 1837061-02, should be considered estimated due to poor precision, and have been qualified "M". The source sample for this QC sample is from a separate work order (Batch QC). No data from this work order were qualified based on the RPD outlier

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

#### Batch B182923 (WEN6 analyses)

The metals results (Five Step SSE (Wenzel)) were *not* method blank corrected as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. The MDL values have been calculated using the standard deviation of the method blanks prepared and analyzed concurrently with the submitted samples. The MRL is set by the value of a low calibration standard in the calibration. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where the native sample result and/or the associated duplicate (DUP) result were below the MDL the RPD was not calculated (**N/C**).

In instances where post spike samples are spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

With the exceptions noted above, all associated quality control sample results met the acceptance criteria. BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', written in a cursive style.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Please see narrative for explanation.                                      |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.                               |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Please see narrative for explanation.  |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Information

| Sample                          | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---------------------------------|------------|---------------|--------|------------|------------|
| SO-PTC-001-091517-11.5-13.5     | 1839006-01 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-129-092017-17.3-20.0     | 1839006-02 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-128+50-ST1-SED-100417-0-0.33 | 1839006-03 | Soil          | Sample | 10/04/2017 | 10/06/2017 |



## Batch Summary

| Analyte  | Lab Matrix    | Method        | Prepared   | Analyzed   | Batch   | Sequence |
|----------|---------------|---------------|------------|------------|---------|----------|
| %TS      | Soil/Sediment | SM 2540G      | 09/28/2018 | 10/09/2018 | B182467 | N/A      |
| Al(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/16/2018 | B182472 | 1801410  |
| Al(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| Al(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182474 | 1801410  |
| Al(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/16/2018 | B182475 | 1801410  |
| Al(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/30/2018 | B182475 | 1801459  |
| Al(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/30/2018 | B182476 | 1801459  |
| As       | Soil/Sediment | EPA 6020B Mod | 10/11/2018 | 10/13/2018 | B182466 | 1801398  |
| As       | Soil/Sediment | EPA 6020B Mod | 10/11/2018 | 10/24/2018 | B182466 | 1801437  |
| As(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/29/2018 | B182810 | 1801459  |
| As(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/29/2018 | B182811 | 1801459  |
| As(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/30/2018 | B182812 | 1801459  |
| As(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/30/2018 | B182813 | 1801459  |
| As(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/30/2018 | B182476 | 1801459  |
| Fe(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/16/2018 | B182472 | 1801410  |
| Fe(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| Fe(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182474 | 1801410  |
| Fe(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/30/2018 | B182475 | 1801459  |
| Fe(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/30/2018 | B182476 | 1801459  |
| Mn(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/16/2018 | B182472 | 1801410  |
| Mn(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| Mn(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182474 | 1801410  |
| Mn(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/16/2018 | B182475 | 1801410  |
| Mn(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/30/2018 | B182476 | 1801459  |
| Si(WEN2) | Soil/Sediment | In-House      | 10/04/2018 | 10/16/2018 | B182472 | 1801410  |
| Si(WEN3) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182473 | 1801410  |
| Si(WEN4) | Soil/Sediment | In-House      | 10/09/2018 | 10/16/2018 | B182474 | 1801410  |
| Si(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/16/2018 | B182475 | 1801410  |
| Si(WEN5) | Soil/Sediment | In-House      | 10/10/2018 | 10/30/2018 | B182813 | 1801459  |
| Si(WEN6) | Soil/Sediment | In-House      | 10/19/2018 | 10/31/2018 | B182923 | 1801474  |



## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result  | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|---------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-001-091517-11.5-13.5</b> |          |               |       |         |           |       |       |       |         |          |
| 1839006-01                         | %TS      | Soil          | NA    | 69.51   |           | 0.01  | 0.05  | %     | B182467 | N/A      |
| 1839006-01                         | Al(WEN2) | Soil          | dry   | 126     |           | 0.242 | 0.450 | mg/kg | B182472 | 1801410  |
| 1839006-01                         | Al(WEN3) | Soil          | dry   | 1300    |           | 0.277 | 0.519 | mg/kg | B182473 | 1801410  |
| 1839006-01                         | Al(WEN4) | Soil          | dry   | 772     |           | 0.692 | 1.38  | mg/kg | B182474 | 1801410  |
| 1839006-01                         | Al(WEN5) | Soil          | dry   | 16400   |           | 2.77  | 5.53  | mg/kg | B182475 | 1801459  |
| 1839006-01                         | Al(WEN6) | Soil          | dry   | 34200   | J-1       | 69.2  | 138   | mg/kg | B182476 | 1801459  |
| 1839006-01                         | As       | Soil          | dry   | 3.46    | H         | 0.517 | 1.21  | mg/kg | B182466 | 1801398  |
| 1839006-01                         | As(WEN2) | Soil          | dry   | 0.354   |           | 0.104 | 0.173 | mg/kg | B182810 | 1801459  |
| 1839006-01                         | As(WEN3) | Soil          | dry   | 0.314   |           | 0.017 | 0.035 | mg/kg | B182811 | 1801459  |
| 1839006-01                         | As(WEN4) | Soil          | dry   | ≤ 0.519 | U         | 0.519 | 1.04  | mg/kg | B182812 | 1801459  |
| 1839006-01                         | As(WEN5) | Soil          | dry   | 2.97    | J         | 1.52  | 3.04  | mg/kg | B182813 | 1801459  |
| 1839006-01                         | As(WEN6) | Soil          | dry   | ≤ 5.53  | U         | 5.53  | 13.8  | mg/kg | B182476 | 1801459  |
| 1839006-01                         | Fe(WEN2) | Soil          | dry   | 87.1    |           | 0.553 | 1.07  | mg/kg | B182472 | 1801410  |
| 1839006-01                         | Fe(WEN3) | Soil          | dry   | 1350    |           | 0.692 | 1.38  | mg/kg | B182473 | 1801410  |
| 1839006-01                         | Fe(WEN4) | Soil          | dry   | 2350    |           | 0.692 | 1.73  | mg/kg | B182474 | 1801410  |
| 1839006-01                         | Fe(WEN5) | Soil          | dry   | 18900   |           | 55.3  | 111   | mg/kg | B182475 | 1801459  |
| 1839006-01                         | Fe(WEN6) | Soil          | dry   | 17000   |           | 36.0  | 69.2  | mg/kg | B182476 | 1801459  |
| 1839006-01                         | Mn(WEN2) | Soil          | dry   | 2.36    |           | 0.003 | 0.035 | mg/kg | B182472 | 1801410  |
| 1839006-01                         | Mn(WEN3) | Soil          | dry   | 11.9    |           | 0.173 | 0.311 | mg/kg | B182473 | 1801410  |
| 1839006-01                         | Mn(WEN4) | Soil          | dry   | 10.3    |           | 0.138 | 0.277 | mg/kg | B182474 | 1801410  |
| 1839006-01                         | Mn(WEN5) | Soil          | dry   | 135     |           | 0.069 | 0.173 | mg/kg | B182475 | 1801410  |
| 1839006-01                         | Mn(WEN6) | Soil          | dry   | 301     |           | 0.830 | 1.66  | mg/kg | B182476 | 1801459  |
| 1839006-01                         | Si(WEN2) | Soil          | dry   | 479     |           | 1.73  | 3.46  | mg/kg | B182472 | 1801410  |
| 1839006-01                         | Si(WEN3) | Soil          | dry   | 503     |           | 2.07  | 4.15  | mg/kg | B182473 | 1801410  |
| 1839006-01                         | Si(WEN4) | Soil          | dry   | 424     |           | 2.25  | 4.50  | mg/kg | B182474 | 1801410  |
| 1839006-01                         | Si(WEN5) | Soil          | dry   | 84.6    | J-1       | 4.84  | 9.68  | mg/kg | B182475 | 1801410  |
| 1839006-01                         | Si(WEN5) | Soil          | dry   | 63.8    | J-1       | 27.7  | 55.3  | mg/kg | B182813 | 1801459  |
| 1839006-01                         | Si(WEN6) | Soil          | dry   | 350000  |           | 1330  | 2660  | mg/kg | B182923 | 1801474  |





## Sample Results

| Sample                             | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|------------------------------------|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-PTC-129-092017-17.3-20.0</b> |          |               |       |        |           |       |       |       |         |          |
| 1839006-02                         | %TS      | Soil          | NA    | 68.74  |           | 0.01  | 0.05  | %     | B182467 | N/A      |
| 1839006-02                         | Al(WEN2) | Soil          | dry   | 20.3   |           | 0.175 | 0.325 | mg/kg | B182472 | 1801410  |
| 1839006-02                         | Al(WEN3) | Soil          | dry   | 481    |           | 0.200 | 0.375 | mg/kg | B182473 | 1801410  |
| 1839006-02                         | Al(WEN4) | Soil          | dry   | 528    |           | 0.500 | 1.00  | mg/kg | B182474 | 1801410  |
| 1839006-02                         | Al(WEN5) | Soil          | dry   | 11900  |           | 2.00  | 4.00  | mg/kg | B182475 | 1801459  |
| 1839006-02                         | Al(WEN6) | Soil          | dry   | 22100  | J-1       | 50.0  | 100   | mg/kg | B182476 | 1801459  |
| 1839006-02                         | As       | Soil          | dry   | 72.7   | H         | 0.523 | 1.22  | mg/kg | B182466 | 1801398  |
| 1839006-02                         | As(WEN2) | Soil          | dry   | 29.7   |           | 3.00  | 5.00  | mg/kg | B182810 | 1801459  |
| 1839006-02                         | As(WEN3) | Soil          | dry   | 11.4   |           | 0.013 | 0.025 | mg/kg | B182811 | 1801459  |
| 1839006-02                         | As(WEN4) | Soil          | dry   | 9.39   |           | 0.375 | 0.750 | mg/kg | B182812 | 1801459  |
| 1839006-02                         | As(WEN5) | Soil          | dry   | 24.5   |           | 1.10  | 2.20  | mg/kg | B182813 | 1801459  |
| 1839006-02                         | As(WEN6) | Soil          | dry   | ≤ 4.00 | U         | 4.00  | 10.0  | mg/kg | B182476 | 1801459  |
| 1839006-02                         | Fe(WEN2) | Soil          | dry   | 20.9   |           | 0.400 | 0.775 | mg/kg | B182472 | 1801410  |
| 1839006-02                         | Fe(WEN3) | Soil          | dry   | 1470   |           | 0.500 | 1.00  | mg/kg | B182473 | 1801410  |
| 1839006-02                         | Fe(WEN4) | Soil          | dry   | 2390   |           | 0.500 | 1.25  | mg/kg | B182474 | 1801410  |
| 1839006-02                         | Fe(WEN5) | Soil          | dry   | 14700  |           | 40.0  | 80.0  | mg/kg | B182475 | 1801459  |
| 1839006-02                         | Fe(WEN6) | Soil          | dry   | 14100  |           | 26.0  | 50.0  | mg/kg | B182476 | 1801459  |
| 1839006-02                         | Mn(WEN2) | Soil          | dry   | 1.29   |           | 0.003 | 0.025 | mg/kg | B182472 | 1801410  |
| 1839006-02                         | Mn(WEN3) | Soil          | dry   | 9.78   |           | 0.125 | 0.225 | mg/kg | B182473 | 1801410  |
| 1839006-02                         | Mn(WEN4) | Soil          | dry   | 10.6   |           | 0.100 | 0.200 | mg/kg | B182474 | 1801410  |
| 1839006-02                         | Mn(WEN5) | Soil          | dry   | 79.6   |           | 0.050 | 0.125 | mg/kg | B182475 | 1801410  |
| 1839006-02                         | Mn(WEN6) | Soil          | dry   | 263    |           | 0.600 | 1.20  | mg/kg | B182476 | 1801459  |
| 1839006-02                         | Si(WEN2) | Soil          | dry   | 432    |           | 1.25  | 2.50  | mg/kg | B182472 | 1801410  |
| 1839006-02                         | Si(WEN3) | Soil          | dry   | 328    |           | 1.50  | 3.00  | mg/kg | B182473 | 1801410  |
| 1839006-02                         | Si(WEN4) | Soil          | dry   | 356    |           | 1.63  | 3.25  | mg/kg | B182474 | 1801410  |
| 1839006-02                         | Si(WEN5) | Soil          | dry   | 59.7   | J-1       | 3.50  | 7.00  | mg/kg | B182475 | 1801410  |
| 1839006-02                         | Si(WEN5) | Soil          | dry   | 50.0   | J-1       | 20.0  | 40.0  | mg/kg | B182813 | 1801459  |
| 1839006-02                         | Si(WEN6) | Soil          | dry   | 268000 |           | 960   | 1920  | mg/kg | B182923 | 1801474  |



## Sample Results

| Sample                                 | Analyte  | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit  | Batch   | Sequence |
|--|----------|---------------|-------|--------|-----------|-------|-------|-------|---------|----------|
| <b>SO-128+50-ST1-SED-100417-0-0.33</b> |          |               |       |        |           |       |       |       |         |          |
| 1839006-03                             | %TS      | Soil          | NA    | 71.96  |           | 0.01  | 0.05  | %     | B182467 | N/A      |
| 1839006-03                             | Al(WEN2) | Soil          | dry   | 2.27   |           | 0.173 | 0.322 | mg/kg | B182472 | 1801410  |
| 1839006-03                             | Al(WEN3) | Soil          | dry   | 703    |           | 0.198 | 0.372 | mg/kg | B182473 | 1801410  |
| 1839006-03                             | Al(WEN4) | Soil          | dry   | 376    |           | 0.496 | 0.991 | mg/kg | B182474 | 1801410  |
| 1839006-03                             | Al(WEN5) | Soil          | dry   | 7920   |           | 0.496 | 0.991 | mg/kg | B182475 | 1801410  |
| 1839006-03                             | Al(WEN6) | Soil          | dry   | 18300  | J-1       | 49.6  | 99.1  | mg/kg | B182476 | 1801459  |
| 1839006-03                             | As       | Soil          | dry   | 10.6   | H         | 0.062 | 0.146 | mg/kg | B182466 | 1801437  |
| 1839006-03                             | As(WEN2) | Soil          | dry   | 1.79   |           | 0.074 | 0.124 | mg/kg | B182810 | 1801459  |
| 1839006-03                             | As(WEN3) | Soil          | dry   | 0.850  |           | 0.012 | 0.025 | mg/kg | B182811 | 1801459  |
| 1839006-03                             | As(WEN4) | Soil          | dry   | 0.424  | J         | 0.372 | 0.743 | mg/kg | B182812 | 1801459  |
| 1839006-03                             | As(WEN5) | Soil          | dry   | 5.56   |           | 1.09  | 2.18  | mg/kg | B182813 | 1801459  |
| 1839006-03                             | As(WEN6) | Soil          | dry   | ≤ 3.96 | U         | 3.96  | 9.91  | mg/kg | B182476 | 1801459  |
| 1839006-03                             | Fe(WEN2) | Soil          | dry   | 187    |           | 0.396 | 0.768 | mg/kg | B182472 | 1801410  |
| 1839006-03                             | Fe(WEN3) | Soil          | dry   | 1780   |           | 0.496 | 0.991 | mg/kg | B182473 | 1801410  |
| 1839006-03                             | Fe(WEN4) | Soil          | dry   | 950    |           | 0.496 | 1.24  | mg/kg | B182474 | 1801410  |
| 1839006-03                             | Fe(WEN5) | Soil          | dry   | 12600  |           | 39.6  | 79.3  | mg/kg | B182475 | 1801459  |
| 1839006-03                             | Fe(WEN6) | Soil          | dry   | 16500  |           | 25.8  | 49.6  | mg/kg | B182476 | 1801459  |
| 1839006-03                             | Mn(WEN2) | Soil          | dry   | 4.44   |           | 0.002 | 0.025 | mg/kg | B182472 | 1801410  |
| 1839006-03                             | Mn(WEN3) | Soil          | dry   | 8.50   |           | 0.124 | 0.223 | mg/kg | B182473 | 1801410  |
| 1839006-03                             | Mn(WEN4) | Soil          | dry   | 4.81   |           | 0.099 | 0.198 | mg/kg | B182474 | 1801410  |
| 1839006-03                             | Mn(WEN5) | Soil          | dry   | 89.1   |           | 0.050 | 0.124 | mg/kg | B182475 | 1801410  |
| 1839006-03                             | Mn(WEN6) | Soil          | dry   | 335    |           | 0.595 | 1.19  | mg/kg | B182476 | 1801459  |
| 1839006-03                             | Si(WEN2) | Soil          | dry   | 240    |           | 1.24  | 2.48  | mg/kg | B182472 | 1801410  |
| 1839006-03                             | Si(WEN3) | Soil          | dry   | 262    |           | 1.49  | 2.97  | mg/kg | B182473 | 1801410  |
| 1839006-03                             | Si(WEN4) | Soil          | dry   | 234    |           | 1.61  | 3.22  | mg/kg | B182474 | 1801410  |
| 1839006-03                             | Si(WEN5) | Soil          | dry   | 51.1   | J-1       | 3.47  | 6.94  | mg/kg | B182475 | 1801410  |
| 1839006-03                             | Si(WEN5) | Soil          | dry   | 31.6   | J-1 J     | 19.8  | 39.6  | mg/kg | B182813 | 1801459  |
| 1839006-03                             | Si(WEN6) | Soil          | dry   | 246000 |           | 952   | 1900  | mg/kg | B182923 | 1801474  |



## Accuracy & Precision Summary

Batch: B182466  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B182466-BS1  | Blank Spike, (1726034)<br>As   |        | 500.0 | 475.0  | mg/kg | 95% 75-125   |              |
| B182466-SRM1 | Standard Reference Material (1805088, CRM052-50G Loamy Clay 1)<br>As |        | 45.80 | 46.07  | mg/kg | 101% 75-125  |              |
| B182466-DUP2 | Duplicate, (1839006-02)<br>As  | 72.69  |       | 81.38  | mg/kg |              | 11% 30       |
| B182466-MS2  | Matrix Spike, (1839006-02)<br>As                                     | 72.69  | 724.9 | 770.1  | mg/kg | 96% 70-130   |              |
| B182466-MSD2 | Matrix Spike Duplicate, (1839006-02)<br>As                           | 72.69  | 727.5 | 770.5  | mg/kg | 96% 70-130   | 0.3% 30      |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B182467  
**Lab Matrix:** Soil/Sediment  
**Method:** SM 2540G

| Sample       | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182467-DUP2 | Duplicate, (1839006-02)<br>%TS | 68.74  |       | 70.02  | %     |              | 2% 15        |



## Accuracy & Precision Summary

Batch: B182472  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B182472-DUP1</b> | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 3.223  |       | 5.427  | mg/kg |              | 51% 25       |
|                     | Fe(WEN2)                        | 0.939  |       | 1.102  | mg/kg |              | 16% 25       |
|                     | Mn(WEN2)                        | 60.75  |       | 48.10  | mg/kg |              | 23% 25       |
|                     | Si(WEN2)                        | 86.37  |       | 76.40  | mg/kg |              | 12% 25       |
| <b>B182472-PS1</b>  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 3.223  | 62.71 | 60.65  | mg/kg | 92% 75-125   |              |
|                     | Fe(WEN2)                        | 0.939  | 62.71 | 59.28  | mg/kg | 93% 75-125   |              |
|                     | Mn(WEN2)                        | 60.75  | 6.271 | 66.26  | mg/kg | 88% 75-125   |              |
|                     | Si(WEN2)                        | 86.37  | 627.1 | 626.1  | mg/kg | 86% 75-125   |              |
| <b>B182472-PS2</b>  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 3.223  | 62.71 | 61.70  | mg/kg | 93% 75-125   |              |
|                     | Fe(WEN2)                        | 0.939  | 62.71 | 59.31  | mg/kg | 93% 75-125   |              |
|                     | Mn(WEN2)                        | 60.75  | 6.271 | 66.31  | mg/kg | 89% 75-125   |              |
|                     | Si(WEN2)                        | 86.37  | 627.1 | 615.5  | mg/kg | 84% 75-125   |              |
| <b>B182472-DUP2</b> | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 28.08  |       | 33.59  | mg/kg |              | 18% 25       |
|                     | Fe(WEN2)                        | 59.03  |       | 60.18  | mg/kg |              | 2% 25        |
|                     | Mn(WEN2)                        | 2.054  |       | 2.092  | mg/kg |              | 2% 25        |
|                     | Si(WEN2)                        | 774.5  |       | 778.7  | mg/kg |              | 0.5% 25      |
| <b>B182472-PS3</b>  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 28.08  | 62.73 | 82.88  | mg/kg | 87% 75-125   |              |
|                     | Fe(WEN2)                        | 59.03  | 62.73 | 117.8  | mg/kg | 94% 75-125   |              |
|                     | Mn(WEN2)                        | 2.054  | 6.273 | 7.705  | mg/kg | 90% 75-125   |              |
|                     | Si(WEN2)                        | 774.5  | 627.3 | 1306   | mg/kg | 85% 75-125   |              |
| <b>B182472-PS4</b>  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|                     | Al(WEN2)                        | 28.08  | 62.73 | 83.06  | mg/kg | 88% 75-125   |              |
|                     | Fe(WEN2)                        | 59.03  | 62.73 | 116.8  | mg/kg | 92% 75-125   |              |
|                     | Mn(WEN2)                        | 2.054  | 6.273 | 7.760  | mg/kg | 91% 75-125   |              |
|                     | Si(WEN2)                        | 774.5  | 627.3 | 1294   | mg/kg | 83% 75-125   |              |



## Accuracy & Precision Summary

Batch: B182473  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182473-DUP1 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Al(WEN3)                        | 229.1  |       | 236.7  | mg/kg |              | 3% 25        |
|              | Fe(WEN3)                        | 808.2  |       | 1246   | mg/kg |              | 43% 25       |
|              | Si(WEN3)                        | 110.5  |       | 132.7  | mg/kg |              | 18% 25       |
| B182473-DUP3 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Mn(WEN3)                        | 140.2  |       | 58.62  | mg/kg |              | 82% 25       |
| B182473-PS1  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|              | Al(WEN3)                        | 229.1  | 62.71 | 291.8  | mg/kg | 100% 75-125  |              |
|              | Fe(WEN3)                        | 808.2  | 62.71 | 883.8  | mg/kg | 121% 75-125  |              |
|              | Si(WEN3)                        | 110.5  | 627.1 | 672.9  | mg/kg | 90% 75-125   |              |
| B182473-PS2  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|              | Al(WEN3)                        | 229.1  | 62.71 | 291.5  | mg/kg | 100% 75-125  |              |
|              | Fe(WEN3)                        | 808.2  | 62.71 | 876.8  | mg/kg | 110% 75-125  |              |
|              | Si(WEN3)                        | 110.5  | 627.1 | 675.1  | mg/kg | 90% 75-125   |              |
| B182473-PS5  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|              | Mn(WEN3)                        | 140.2  | 250.8 | 363.7  | mg/kg | 89% 75-125   |              |
| B182473-PS6  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|              | Mn(WEN3)                        | 140.2  | 250.8 | 361.4  | mg/kg | 88% 75-125   |              |
| B182473-DUP2 | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|              | Al(WEN3)                        | 290.6  |       | 305.4  | mg/kg |              | 5% 25        |
|              | Fe(WEN3)                        | 1028   |       | 959.9  | mg/kg |              | 7% 25        |
|              | Mn(WEN3)                        | 17.82  |       | 18.56  | mg/kg |              | 4% 25        |
|              | Si(WEN3)                        | 378.5  |       | 416.8  | mg/kg |              | 10% 25       |
| B182473-PS3  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Al(WEN3)                        | 290.6  | 62.73 | 344.6  | mg/kg | 86% 75-125   |              |
|              | Fe(WEN3)                        | 1028   | 62.73 | 1095   | mg/kg | 107% 75-125  |              |
|              | Mn(WEN3)                        | 17.82  | 6.273 | 23.84  | mg/kg | 96% 75-125   |              |
|              | Si(WEN3)                        | 378.5  | 627.3 | 938.2  | mg/kg | 89% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B182473  
**Lab Matrix:** Soil/Sediment  
**Method:** In-House

| Sample      | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182473-PS4 | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|             | Al(WEN3)                        | 290.6  | 62.73 | 346.7  | mg/kg | 89% 75-125   |              |
|             | Fe(WEN3)                        | 1028   | 62.73 | 1087   | mg/kg | 95% 75-125   |              |
|             | Mn(WEN3)                        | 17.82  | 6.273 | 23.56  | mg/kg | 91% 75-125   |              |
|             | Si(WEN3)                        | 378.5  | 627.3 | 942.6  | mg/kg | 90% 75-125   |              |



## Accuracy & Precision Summary

Batch: B182474  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample              | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|---------------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| <b>B182474-DUP1</b> | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 350.6  |       | 330.8  | mg/kg |              | 6% 25        |
|                     | Fe(WEN4)                        | 2401   |       | 1851   | mg/kg |              | 26% 25       |
|                     | Mn(WEN4)                        | 22.85  |       | 14.76  | mg/kg |              | 43% 25       |
|                     | Si(WEN4)                        | 253.5  |       | 736.3  | mg/kg |              | 98% 25       |
| <b>B182474-PS1</b>  | <b>Post Spike, (1837061-02)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 350.6  | 62.71 | 408.9  | mg/kg | 93% 75-125   |              |
|                     | Fe(WEN4)                        | 2401   | 62.71 | 2479   | mg/kg | 124% 75-125  |              |
|                     | Mn(WEN4)                        | 22.85  | 6.271 | 28.44  | mg/kg | 89% 75-125   |              |
|                     | Si(WEN4)                        | 253.5  | 627.1 | 799.4  | mg/kg | 87% 75-125   |              |
| <b>B182474-DUP2</b> | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 580.3  |       | 553.6  | mg/kg |              | 5% 25        |
|                     | Fe(WEN4)                        | 1235   |       | 1155   | mg/kg |              | 7% 25        |
|                     | Mn(WEN4)                        | 8.595  |       | 8.200  | mg/kg |              | 5% 25        |
|                     | Si(WEN4)                        | 522.5  |       | 495.8  | mg/kg |              | 5% 25        |
| <b>B182474-PS3</b>  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 580.3  | 62.73 | 638.3  | mg/kg | 92% 75-125   |              |
|                     | Fe(WEN4)                        | 1235   | 62.73 | 1292   | mg/kg | 90% 75-125   |              |
|                     | Mn(WEN4)                        | 8.595  | 6.273 | 14.64  | mg/kg | 96% 75-125   |              |
|                     | Si(WEN4)                        | 522.5  | 627.3 | 1061   | mg/kg | 86% 75-125   |              |
| <b>B182474-PS4</b>  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|                     | Al(WEN4)                        | 580.3  | 62.73 | 642.0  | mg/kg | 98% 75-125   |              |
|                     | Fe(WEN4)                        | 1235   | 62.73 | 1309   | mg/kg | 118% 75-125  |              |
|                     | Mn(WEN4)                        | 8.595  | 6.273 | 14.73  | mg/kg | 98% 75-125   |              |
|                     | Si(WEN4)                        | 522.5  | 627.3 | 1059   | mg/kg | 86% 75-125   |              |





## Accuracy & Precision Summary

Batch: B182475  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182475-BS1  | <b>Blank Spike, (1841032)</b>   |        |       |        |       |              |              |
|              | Al(WEN5)  |        | 250.0 | 235.2  | mg/kg | 94% 75-125   |              |
|              | Fe(WEN5)  |        | 250.0 | 241.4  | mg/kg | 97% 75-125   |              |
|              | Mn(WEN5)  |        | 25.00 | 23.01  | mg/kg | 92% 75-125   |              |
| B182475-SRM2 | <b>Standard Reference Material (1805088, CRM052-50G Loamy Clay 1)</b> |        |       |        |       |              |              |
|              | Al(WEN5)  |        | 11500 | 9117   | mg/kg | 79% N/A      |              |
|              | Fe(WEN5)  |        | 5090  | 4894   | mg/kg | 96% N/A      |              |
|              | Mn(WEN5)  |        | 552.0 | 574.8  | mg/kg | 104% N/A     |              |
| B182475-SRM4 | <b>Standard Reference Material (1805088, CRM052-50G Loamy Clay 1)</b> |        |       |        |       |              |              |
|              | Si(WEN5)  |        | 795.0 | 351.3  | mg/kg | 44% N/A      |              |
| B182475-DUP1 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Al(WEN5)  | 10610  |       | 12000  | mg/kg |              | 12% 25       |
|              | Si(WEN5)  | 55.79  |       | 65.28  | mg/kg |              | 16% 25       |
| B182475-DUP3 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Fe(WEN5)  | 14490  |       | 15680  | mg/kg |              | 8% 25        |
|              | Mn(WEN5)  | 229.3  |       | 214.1  | mg/kg |              | 7% 25        |
| B182475-PS1  | <b>Post Spike, (1837061-02)</b>                                       |        |       |        |       |              |              |
|              | Al(WEN5)  | 10610  | 125.4 | 10720  | mg/kg | 91% 75-125   |              |
|              | Si(WEN5)  | 55.79  | 1254  | 1165   | mg/kg | 88% 75-125   |              |
| B182475-PS2  | <b>Post Spike, (1837061-02)</b>                                       |        |       |        |       |              |              |
|              | Al(WEN5)  | 10610  | 125.4 | 10680  | mg/kg | 58% 75-125   |              |
|              | Si(WEN5)  | 55.79  | 1254  | 1177   | mg/kg | 89% 75-125   |              |
| B182475-PS5  | <b>Post Spike, (1837061-02)</b>                                       |        |       |        |       |              |              |
|              | Fe(WEN5)  | 14490  | 501.6 | 14900  | mg/kg | 83% 75-125   |              |
|              | Mn(WEN5)  | 229.3  | 50.16 | 280.4  | mg/kg | 102% 75-125  |              |
| B182475-PS6  | <b>Post Spike, (1837061-02)</b>                                       |        |       |        |       |              |              |
|              | Fe(WEN5)  | 14490  | 501.6 | 14830  | mg/kg | 68% 75-125   |              |
|              | Mn(WEN5)  | 229.3  | 50.16 | 280.6  | mg/kg | 102% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182475  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182475-DUP2 | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|              | Al(WEN5)                        | 9893   |       | 10510  | mg/kg |              | 6% 25        |
|              | Si(WEN5)                        | 68.04  |       | 55.48  | mg/kg |              | 20% 25       |
| B182475-DUP4 | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|              | Fe(WEN5)                        | 12010  |       | 12520  | mg/kg |              | 4% 25        |
| B182475-PS3  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Al(WEN5)                        | 9893   | 125.5 | 10130  | mg/kg | 190% 75-125  |              |
|              | Mn(WEN5)                        | 92.31  | 12.55 | 104.4  | mg/kg | 96% 75-125   |              |
|              | Si(WEN5)                        | 68.04  | 1255  | 1180   | mg/kg | 89% 75-125   |              |
| B182475-PS4  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Al(WEN5)                        | 9893   | 125.5 | 10170  | mg/kg | 219% 75-125  |              |
|              | Mn(WEN5)                        | 92.31  | 12.55 | 104.5  | mg/kg | 97% 75-125   |              |
|              | Si(WEN5)                        | 68.04  | 1255  | 1170   | mg/kg | 88% 75-125   |              |
| B182475-PS7  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Fe(WEN5)                        | 12010  | 50190 | 58510  | mg/kg | 93% 75-125   |              |
| B182475-PS8  | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|              | Fe(WEN5)                        | 12010  | 50190 | 58900  | mg/kg | 93% 75-125   |              |



## Accuracy & Precision Summary

Batch: B182476  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte   | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|---|--------|-------|--------|-------|--------------|--------------|
| B182476-BS1  | <b>Blank Spike, (1844015)</b>   |        |       |        |       |              |              |
|              | Al(WEN6)  |        | 500.0 | 428.4  | mg/kg | 86% 75-125   |              |
|              | As(WEN6)  |        | 50.00 | 46.75  | mg/kg | 93% 75-125   |              |
|              | Fe(WEN6)  |        | 500.0 | 478.4  | mg/kg | 96% 75-125   |              |
|              | Mn(WEN6)  |        | 50.00 | 47.96  | mg/kg | 96% 75-125   |              |
| B182476-SRM2 | <b>Standard Reference Material (NC00391, NIST 2702 Inorganics in Marine Sediment)</b> |        |       |        |       |              |              |
|              | Al(WEN6)  |        | 84100 | 37860  | mg/kg | 45% 75-125   |              |
|              | As(WEN6)  |        | 45.30 | 38.03  | mg/kg | 84% 75-125   |              |
|              | Fe(WEN6)  |        | 79100 | 61640  | mg/kg | 78% 75-125   |              |
|              | Mn(WEN6)  |        | 1757  | 1434   | mg/kg | 82% 75-125   |              |
| B182476-DUP3 | <b>Duplicate, (1837061-02)</b>  |        |       |        |       |              |              |
|              | Al(WEN6)  | 25910  |       | 16120  | mg/kg |              | 47% 25       |
|              | As(WEN6)  | ND     |       | ND     | mg/kg |              | N/C 25       |
|              | Fe(WEN6)  | 11140  |       | 17350  | mg/kg |              | 44% 25       |
|              | Mn(WEN6)  | 259.0  |       | 542.3  | mg/kg |              | 71% 25       |
| B182476-PS5  | <b>Post Spike, (1837061-02)</b>   |        |       |        |       |              |              |
|              | Al(WEN6)  | 25910  | 1003  | 26350  | mg/kg | 44% 75-125   |              |
|              | As(WEN6)  | ND     | 100.3 | 90.53  | mg/kg | 90% 75-125   |              |
|              | Fe(WEN6)  | 11140  | 1003  | 11830  | mg/kg | 69% 75-125   |              |
|              | Mn(WEN6)  | 259.0  | 100.3 | 355.0  | mg/kg | 96% 75-125   |              |
| B182476-PS6  | <b>Post Spike, (1837061-02)</b>   |        |       |        |       |              |              |
|              | Al(WEN6)  | 25910  | 1003  | 25910  | mg/kg | 0.7% 75-125  |              |
|              | As(WEN6)  | ND     | 100.3 | 90.84  | mg/kg | 91% 75-125   |              |
|              | Fe(WEN6)  | 11140  | 1003  | 11620  | mg/kg | 47% 75-125   |              |
|              | Mn(WEN6)  | 259.0  | 100.3 | 356.3  | mg/kg | 97% 75-125   |              |
| B182476-DUP4 | <b>Duplicate, (1837061-06)</b>  |        |       |        |       |              |              |
|              | Al(WEN6)  | 21440  |       | 22040  | mg/kg |              | 3% 25        |
|              | As(WEN6)  | 23.93  |       | 23.94  | mg/kg |              | 0.03% 25     |
|              | Fe(WEN6)  | 10440  |       | 10210  | mg/kg |              | 2% 25        |
|              | Mn(WEN6)  | 182.1  |       | 177.0  | mg/kg |              | 3% 25        |



## Accuracy & Precision Summary

Batch: B182476  
Lab Matrix: Soil/Sediment  
Method: In-House

| Sample      | Analyte                         | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|---------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182476-PS7 | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|             | Al(WEN6)                        | 21440  | 1004  | 22250  | mg/kg | 80% 75-125   |              |
|             | As(WEN6)                        | 23.93  | 100.4 | 112.8  | mg/kg | 89% 75-125   |              |
|             | Fe(WEN6)                        | 10440  | 1004  | 11270  | mg/kg | 82% 75-125   |              |
|             | Mn(WEN6)                        | 182.1  | 100.4 | 277.3  | mg/kg | 95% 75-125   |              |
| B182476-PS8 | <b>Post Spike, (1837061-06)</b> |        |       |        |       |              |              |
|             | Al(WEN6)                        | 21440  | 1004  | 22220  | mg/kg | 77% 75-125   |              |
|             | As(WEN6)                        | 23.93  | 100.4 | 113.3  | mg/kg | 89% 75-125   |              |
|             | Fe(WEN6)                        | 10440  | 1004  | 11280  | mg/kg | 84% 75-125   |              |
|             | Mn(WEN6)                        | 182.1  | 100.4 | 284.5  | mg/kg | 102% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182810  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182810-DUP1 | Duplicate, (1837061-02)<br>As(WEN2)  | 0.540  |       | 0.407  | mg/kg |              | 28% 25       |
| B182810-PS1  | Post Spike, (1837061-02)<br>As(WEN2) | 0.540  | 6.271 | 5.912  | mg/kg | 86% 75-125   |              |
| B182810-PS2  | Post Spike, (1837061-02)<br>As(WEN2) | 0.540  | 6.271 | 5.842  | mg/kg | 85% 75-125   |              |
| B182810-DUP2 | Duplicate, (1837061-06)<br>As(WEN2)  | 3964   |       | 4251   | mg/kg |              | 7% 25        |
| B182810-PS3  | Post Spike, (1837061-06)<br>As(WEN2) | 3964   | 1255  | 5497   | mg/kg | 122% 75-125  |              |
| B182810-PS4  | Post Spike, (1837061-06)<br>As(WEN2) | 3964   | 1255  | 5347   | mg/kg | 110% 75-125  |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B182811  
**Lab Matrix:** Soil/Sediment  
**Method:** In-House

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182811-DUP2 | Duplicate, (1837061-06)<br>As(WEN3)  | 474.6  |       | 483.1  | mg/kg |              | 2% 25        |
| B182811-PS3  | Post Spike, (1837061-06)<br>As(WEN3) | 474.6  | 250.9 | 722.9  | mg/kg | 99% 75-125   |              |
| B182811-PS4  | Post Spike, (1837061-06)<br>As(WEN3) | 474.6  | 250.9 | 726.8  | mg/kg | 100% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182812  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte                              | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B182812-DUP1 | Duplicate, (1837061-02)<br>As(WEN4)  | 0.878  |       | 0.565  | mg/kg |              | 43% 25       |
| B182812-PS1  | Post Spike, (1837061-02)<br>As(WEN4) | 0.878  | 6.271 | 6.697  | mg/kg | 93% 75-125   |              |
| B182812-PS2  | Post Spike, (1837061-02)<br>As(WEN4) | 0.878  | 6.271 | 6.886  | mg/kg | 96% 75-125   |              |
| B182812-DUP2 | Duplicate, (1837061-06)<br>As(WEN4)  | 111.3  |       | 102.3  | mg/kg |              | 8% 25        |
| B182812-PS3  | Post Spike, (1837061-06)<br>As(WEN4) | 111.3  | 25.09 | 137.5  | mg/kg | 104% 75-125  |              |
| B182812-PS4  | Post Spike, (1837061-06)<br>As(WEN4) | 111.3  | 25.09 | 142.7  | mg/kg | 125% 75-125  |              |



## Accuracy & Precision Summary

Batch: B182813  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte  | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|-------|--------|-------|--------------|--------------|
| B182813-BS1  | Blank Spike, (1841032)<br>As(WEN5)   |        | 25.00 | 24.03  | mg/kg | 96% 75-125   |              |
| B182813-SRM2 | Standard Reference Material (1805088, CRM052-50G Loamy Clay 1)<br>As(WEN5) |        | 45.80 | 45.32  | mg/kg | 99% N/A      |              |
| B182813-DUP1 | Duplicate, (1837061-02)<br>As(WEN5)  | 1.941  |       | 1.453  | mg/kg |              | 29% 25       |
| B182813-PS1  | Post Spike, (1837061-02)<br>As(WEN5)                                       | 1.941  | 50.16 | 48.12  | mg/kg | 92% 75-125   |              |
| B182813-PS2  | Post Spike, (1837061-02)<br>As(WEN5)                                       | 1.941  | 50.16 | 49.26  | mg/kg | 94% 75-125   |              |
| B182813-DUP2 | Duplicate, (1837061-06)<br>As(WEN5)  | 1195   |       | 1171   | mg/kg |              | 2% 25        |
| B182813-PS3  | Post Spike, (1837061-06)<br>As(WEN5)                                       | 1195   | 5019  | 5800   | mg/kg | 92% 75-125   |              |
| B182813-PS4  | Post Spike, (1837061-06)<br>As(WEN5)                                       | 1195   | 5019  | 5853   | mg/kg | 93% 75-125   |              |





## Accuracy & Precision Summary

Batch: B182923  
 Lab Matrix: Soil/Sediment  
 Method: In-House

| Sample       | Analyte  | Native | Spike  | Result | Units | REC & Limits | RPD & Limits |
|--------------|--|--------|--------|--------|-------|--------------|--------------|
| B182923-BS2  | Blank Spike, (1806125)<br>Si(WEN6)   |        | 1000   | 791.2  | mg/kg | 79% 75-125   |              |
| B182923-SRM3 | Standard Reference Material (NC00392, NIST 1633c Trace Elements in Coal Fly Ash)<br>Si(WEN6) |        | 213000 | 202500 | mg/kg | 95% 75-125   |              |
| B182923-DUP1 | Duplicate, (1837061-02)<br>Si(WEN6)  | 306100 |        | 294300 | mg/kg |              | 4% 25        |
| B182923-PS1  | Post Spike, (1837061-02)<br>Si(WEN6)   | 306100 | 100300 | 398500 | mg/kg | 92% 75-125   |              |
| B182923-PS2  | Post Spike, (1837061-02)<br>Si(WEN6)   | 306100 | 100300 | 397000 | mg/kg | 91% 75-125   |              |
| B182923-DUP2 | Duplicate, (1837061-06)<br>Si(WEN6)  | 226400 |        | 221300 | mg/kg |              | 2% 25        |
| B182923-PS3  | Post Spike, (1837061-06)<br>Si(WEN6)   | 226400 | 100400 | 324800 | mg/kg | 98% 75-125   |              |
| B182923-PS4  | Post Spike, (1837061-06)<br>Si(WEN6)   | 226400 | 100400 | 320600 | mg/kg | 94% 75-125   |              |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182466  
**Matrix:** Soil/Sediment  
**Method:** EPA 6020B Mod  
**Analyte:** As

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182466-BLK1    | 0.006  | mg/kg |                   |
| B182466-BLK2    | 0.012  | mg/kg |                   |
| B182466-BLK3    | 0.035  | mg/kg |                   |
| B182466-BLK4    | 0.030  | mg/kg |                   |
| <b>Average:</b> | 0.021  |       | <b>MDL:</b> 0.045 |
| <b>Limit:</b>   | 0.105  |       | <b>MRL:</b> 0.105 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182467  
**Matrix:** Soil/Sediment  
**Method:** SM 2540G  
**Analyte:** %TS

| Sample       | Result | Units |
|--------------|--------|-------|
| B182467-BLK1 | 0.00   | %     |
| B182467-BLK2 | 0.00   | %     |

**Average:** 0.00  
**Limit:** 0.05

**MDL:** 0.01  
**MRL:** 0.05



## Method Blanks & Reporting Limits

**Batch:** B182472  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182472-BLK1    | 0.087        | mg/kg |                   |
| B182472-BLK2    | 0.062        | mg/kg |                   |
| B182472-BLK3    | 0.031        | mg/kg |                   |
| B182472-BLK4    | 0.107        | mg/kg |                   |
| <b>Average:</b> | <b>0.072</b> |       | <b>MDL: 0.175</b> |
| <b>Limit:</b>   | <b>0.325</b> |       | <b>MRL: 0.325</b> |

**Analyte:** Fe(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182472-BLK1    | 0.104        | mg/kg |                   |
| B182472-BLK2    | 0.266        | mg/kg |                   |
| B182472-BLK3    | 0.090        | mg/kg |                   |
| B182472-BLK4    | 0.132        | mg/kg |                   |
| <b>Average:</b> | <b>0.148</b> |       | <b>MDL: 0.400</b> |
| <b>Limit:</b>   | <b>0.775</b> |       | <b>MRL: 0.775</b> |

**Analyte:** Mn(WEN2)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182472-BLK1    | 0.002        | mg/kg |                   |
| B182472-BLK2    | 0.0005       | mg/kg |                   |
| B182472-BLK3    | 0.001        | mg/kg |                   |
| B182472-BLK4    | 0.002        | mg/kg |                   |
| <b>Average:</b> | <b>0.001</b> |       | <b>MDL: 0.002</b> |
| <b>Limit:</b>   | <b>0.025</b> |       | <b>MRL: 0.025</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si(WEN2)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B182472-BLK1    | -0.528        | mg/kg        |                  |
| B182472-BLK2    | -0.872        | mg/kg        |                  |
| B182472-BLK3    | -0.796        | mg/kg        |                  |
| B182472-BLK4    | -0.857        | mg/kg        |                  |
| <b>Average:</b> | <b>-0.763</b> |              | <b>MDL: 1.25</b> |
| <b>Limit:</b>   | <b>2.500</b>  |              | <b>MRL: 2.50</b> |



## Method Blanks & Reporting Limits

**Batch:** B182473  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182473-BLK1    | 0.084        | mg/kg |                   |
| B182473-BLK2    | 0.037        | mg/kg |                   |
| B182473-BLK3    | 0.103        | mg/kg |                   |
| B182473-BLK4    | 0.005        | mg/kg |                   |
| <b>Average:</b> | <b>0.057</b> |       | <b>MDL: 0.200</b> |
| <b>Limit:</b>   | <b>0.375</b> |       | <b>MRL: 0.375</b> |

**Analyte:** Fe(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182473-BLK1    | 0.477        | mg/kg |                   |
| B182473-BLK2    | 0.464        | mg/kg |                   |
| B182473-BLK3    | 0.465        | mg/kg |                   |
| B182473-BLK4    | 0.482        | mg/kg |                   |
| <b>Average:</b> | <b>0.472</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>1.000</b> |       | <b>MRL: 1.00</b>  |

**Analyte:** Mn(WEN3)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182473-BLK1    | 0.111        | mg/kg |                   |
| B182473-BLK2    | 0.109        | mg/kg |                   |
| B182473-BLK3    | 0.112        | mg/kg |                   |
| B182473-BLK4    | 0.112        | mg/kg |                   |
| <b>Average:</b> | <b>0.111</b> |       | <b>MDL: 0.125</b> |
| <b>Limit:</b>   | <b>0.225</b> |       | <b>MRL: 0.225</b> |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si(WEN3)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B182473-BLK1    | -1.40         | mg/kg        |                  |
| B182473-BLK2    | -1.38         | mg/kg        |                  |
| B182473-BLK3    | -1.38         | mg/kg        |                  |
| B182473-BLK4    | -1.29         | mg/kg        |                  |
| <b>Average:</b> | <b>-1.364</b> |              | <b>MDL: 1.50</b> |
| <b>Limit:</b>   | <b>3.000</b>  |              | <b>MRL: 3.00</b> |



## Method Blanks & Reporting Limits

**Batch:** B182474  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182474-BLK1    | 0.035        | mg/kg |                   |
| B182474-BLK2    | 0.295        | mg/kg |                   |
| B182474-BLK3    | 0.041        | mg/kg |                   |
| B182474-BLK4    | 0.033        | mg/kg |                   |
| <b>Average:</b> | <b>0.101</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>1.000</b> |       | <b>MRL: 1.00</b>  |

**Analyte:** Fe(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182474-BLK1    | 0.521        | mg/kg |                   |
| B182474-BLK2    | 0.534        | mg/kg |                   |
| B182474-BLK3    | 0.508        | mg/kg |                   |
| B182474-BLK4    | 0.482        | mg/kg |                   |
| <b>Average:</b> | <b>0.511</b> |       | <b>MDL: 0.500</b> |
| <b>Limit:</b>   | <b>1.250</b> |       | <b>MRL: 1.25</b>  |

**Analyte:** Mn(WEN4)

| Sample          | Result       | Units |                   |
|-----------------|--------------|-------|-------------------|
| B182474-BLK1    | 0.097        | mg/kg |                   |
| B182474-BLK2    | 0.097        | mg/kg |                   |
| B182474-BLK3    | 0.099        | mg/kg |                   |
| B182474-BLK4    | 0.097        | mg/kg |                   |
| <b>Average:</b> | <b>0.098</b> |       | <b>MDL: 0.100</b> |
| <b>Limit:</b>   | <b>0.200</b> |       | <b>MRL: 0.200</b> |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si(WEN4)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B182474-BLK1    | -1.34         | mg/kg        |                  |
| B182474-BLK2    | -1.24         | mg/kg        |                  |
| B182474-BLK3    | -1.36         | mg/kg        |                  |
| B182474-BLK4    | -1.46         | mg/kg        |                  |
| <b>Average:</b> | <b>-1.349</b> |              | <b>MDL: 1.62</b> |
| <b>Limit:</b>   | <b>3.250</b>  |              | <b>MRL: 3.25</b> |



## Method Blanks & Reporting Limits

**Batch:** B182475  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN5)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182475-BLK1    | 0.128  | mg/kg |                   |
| B182475-BLK2    | 0.023  | mg/kg |                   |
| B182475-BLK3    | 2.84   | mg/kg |                   |
| B182475-BLK4    | 0.262  | mg/kg |                   |
| <b>Average:</b> | 0.814  |       | <b>MDL:</b> 0.500 |
| <b>Limit:</b>   | 1.000  |       | <b>MRL:</b> 1.00  |

**Analyte:** Fe(WEN5)

| Sample          | Result | Units |                  |
|-----------------|--------|-------|------------------|
| B182475-BLK1    | 3.74   | mg/kg |                  |
| B182475-BLK2    | 0.129  | mg/kg |                  |
| B182475-BLK3    | 5.08   | mg/kg |                  |
| B182475-BLK4    | 0.176  | mg/kg |                  |
| <b>Average:</b> | 2.283  |       | <b>MDL:</b> 10.0 |
| <b>Limit:</b>   | 20.000 |       | <b>MRL:</b> 20.0 |

**Analyte:** Mn(WEN5)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182475-BLK1    | 0.035  | mg/kg |                   |
| B182475-BLK2    | 0.005  | mg/kg |                   |
| B182475-BLK3    | 0.004  | mg/kg |                   |
| B182475-BLK4    | 0.004  | mg/kg |                   |
| <b>Average:</b> | 0.012  |       | <b>MDL:</b> 0.050 |
| <b>Limit:</b>   | 0.125  |       | <b>MRL:</b> 0.125 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Si(WEN5)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                  |
|-----------------|---------------|--------------|------------------|
| B182475-BLK1    | -2.83         | mg/kg        |                  |
| B182475-BLK2    | -2.37         | mg/kg        |                  |
| B182475-BLK3    | -2.40         | mg/kg        |                  |
| B182475-BLK4    | -1.89         | mg/kg        |                  |
| <b>Average:</b> | <b>-2.370</b> |              | <b>MDL: 3.50</b> |
| <b>Limit:</b>   | <b>7.000</b>  |              | <b>MRL: 7.00</b> |



## Method Blanks & Reporting Limits

**Batch:** B182476  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Al(WEN6)

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B182476-BLK1    | 2.20          | mg/kg |                  |
| B182476-BLK2    | 3.94          | mg/kg |                  |
| B182476-BLK3    | 1.75          | mg/kg |                  |
| B182476-BLK4    | 1.64          | mg/kg |                  |
| <b>Average:</b> | <b>2.382</b>  |       | <b>MDL:</b> 12.5 |
| <b>Limit:</b>   | <b>25.000</b> |       | <b>MRL:</b> 25.0 |

**Analyte:** As(WEN6)

| Sample          | Result       | Units |                  |
|-----------------|--------------|-------|------------------|
| B182476-BLK1    | 0.385        | mg/kg |                  |
| B182476-BLK2    | 0.429        | mg/kg |                  |
| B182476-BLK3    | 0.466        | mg/kg |                  |
| B182476-BLK4    | 0.485        | mg/kg |                  |
| <b>Average:</b> | <b>0.441</b> |       | <b>MDL:</b> 1.00 |
| <b>Limit:</b>   | <b>2.500</b> |       | <b>MRL:</b> 2.50 |

**Analyte:** Fe(WEN6)

| Sample          | Result        | Units |                  |
|-----------------|---------------|-------|------------------|
| B182476-BLK1    | 0.637         | mg/kg |                  |
| B182476-BLK2    | 1.79          | mg/kg |                  |
| B182476-BLK3    | 0.427         | mg/kg |                  |
| B182476-BLK4    | 20.2          | mg/kg |                  |
| <b>Average:</b> | <b>5.761</b>  |       | <b>MDL:</b> 6.50 |
| <b>Limit:</b>   | <b>12.500</b> |       | <b>MRL:</b> 12.5 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Analyte:** Mn(WEN6)

| <b>Sample</b>   | <b>Result</b> | <b>Units</b> |                   |
|-----------------|---------------|--------------|-------------------|
| B182476-BLK1    | 0.004         | mg/kg        |                   |
| B182476-BLK2    | 0.019         | mg/kg        |                   |
| B182476-BLK3    | 0.001         | mg/kg        |                   |
| B182476-BLK4    | 0.046         | mg/kg        |                   |
| <b>Average:</b> | 0.018         |              | <b>MDL:</b> 0.150 |
| <b>Limit:</b>   | 0.300         |              | <b>MRL:</b> 0.300 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182810  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN2)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182810-BLK1    | 0.008  | mg/kg |                   |
| B182810-BLK2    | 0.005  | mg/kg |                   |
| B182810-BLK3    | 0.040  | mg/kg |                   |
| B182810-BLK4    | 0.008  | mg/kg |                   |
| <b>Average:</b> | 0.015  |       | <b>MDL:</b> 0.075 |
| <b>Limit:</b>   | 0.125  |       | <b>MRL:</b> 0.125 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182811  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN3)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182811-BLK1    | 0.009  | mg/kg |                   |
| B182811-BLK2    | 0.006  | mg/kg |                   |
| B182811-BLK3    | 0.005  | mg/kg |                   |
| B182811-BLK4    | 0.007  | mg/kg |                   |
| <b>Average:</b> | 0.007  |       | <b>MDL:</b> 0.012 |
| <b>Limit:</b>   | 0.025  |       | <b>MRL:</b> 0.025 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182812  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN4)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182812-BLK1    | 0.022  | mg/kg |                   |
| B182812-BLK2    | 0.097  | mg/kg |                   |
| B182812-BLK3    | 0.165  | mg/kg |                   |
| B182812-BLK4    | 0.216  | mg/kg |                   |
| <b>Average:</b> | 0.125  |       | <b>MDL:</b> 0.375 |
| <b>Limit:</b>   | 0.750  |       | <b>MRL:</b> 0.750 |



**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182813  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** As(WEN5)

| Sample          | Result | Units |                   |
|-----------------|--------|-------|-------------------|
| B182813-BLK1    | 0.209  | mg/kg |                   |
| B182813-BLK2    | 0.148  | mg/kg |                   |
| B182813-BLK3    | 0.130  | mg/kg |                   |
| B182813-BLK4    | 0.114  | mg/kg |                   |
| <b>Average:</b> | 0.150  |       | <b>MDL:</b> 0.275 |
| <b>Limit:</b>   | 0.550  |       | <b>MRL:</b> 0.550 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B182923  
**Matrix:** Soil/Sediment  
**Method:** In-House  
**Analyte:** Si(WEN6)

| Sample       | Result | Units |
|--------------|--------|-------|
| B182923-BLK1 | 1.69   | mg/kg |
| B182923-BLK2 | -1.20  | mg/kg |
| B182923-BLK3 | -11.9  | mg/kg |
| B182923-BLK4 | -9.98  | mg/kg |

**Average:** -5.349  
**Limit:** 48.000

**MDL:** 24.0  
**MRL:** 48.0

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|   |                     |            |   |                     |  |
|---|---------------------|------------|---|---------------------|--|
| <b>Lab ID:</b> 1839006-01<br><b>Sample:</b> SO-PTC-001-091517-11.5-13.5<br><b>Des Container</b><br>A Jar HDPE     | <b>Size</b><br>8 oz | <b>Lot</b> | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/15/2017<br><b>Received:</b> 09/15/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler 10 -<br>1839006 |
| <b>Lab ID:</b> 1839006-02<br><b>Sample:</b> SO-PTC-129-092017-17.3-20.0<br><b>Des Container</b><br>A Jar HDPE     | <b>Size</b><br>8 oz | <b>Lot</b> | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 09/20/2017<br><b>Received:</b> 09/21/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler 10 -<br>1839006 |
| <b>Lab ID:</b> 1839006-03<br><b>Sample:</b> SO-128+50-ST1-SED-100417-0-0.33<br><b>Des Container</b><br>A Jar HDPE | <b>Size</b><br>8 oz | <b>Lot</b> | <b>Report Matrix:</b> Soil<br><b>Sample Type:</b> Sample<br><b>Preservation</b><br>none | <b>P-Lot</b><br>n/a | <b>Collected:</b> 10/04/2017<br><b>Received:</b> 10/06/2017<br><b>pH</b><br><b>Ship. Cont.</b><br>Cooler 10 -<br>1839006 |

**Project ID:** PTC-OA1701  
**PM:** Jeremy Maute



BAL Report 1839006  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### Cooler 10 - 1839006

**Received:** September 15, 2017 16:30  
**Tracking No:** n/a via Courier  
**Coolant Type:** Blue ice  
**Temperature:** 11.3 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR #8

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes

### Cooler 10 - 1839006

**Received:** September 21, 2017 9:10  
**Tracking No:** n/a via Courier  
**Coolant Type:** Blue ice  
**Temperature:** 11.3 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR #8

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes

### Cooler 10 - 1839006

**Received:** October 6, 2017 14:30  
**Tracking No:** n/a via Courier  
**Coolant Type:** Blue ice  
**Temperature:** 11.3 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR #8

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

BAL Report 1839006

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466 / *dgcooper*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Lauren Miller* For BAL use only Date: 9/15/17  
 Work Order ID: \_\_\_\_\_ Time: 1630  
 Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_  
18804 North Creek Parkway, Suite 100, Bothell, WA 98011-3127  
 Troy Bussey (PIONEER)  
 360-570-1700  
 tbussey@uspioneer.com

Email Receipt Confirmation? Yes  
 BAL PM: **Jeremy Maute**

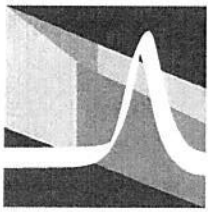
| Requested TAT (business days)  | Collection                              |               | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|---------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time          | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |               |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |               |                    |                      |                 |                           |  |   |   |   |   |   |  |          | Specify Here                         |
| 1  | JO-PTC-101-091417-8.2-10.2              | 9/14/17 1350  | SOIL               | 1                    |                 |                           | X  | X   |   |   |   |   |  |          |                                      |
| 2  | JO-PTC-101-091417-19.3-20.3             | 9/14/17 1405  | SOIL               | 1                    |                 |                           | X  | X   |   |   |   |   |  |          |                                      |
| 3  | JO-PTC-001-091517-2.5-4.5               | 9/15/17 11:50 | SOIL               | 1                    |                 |                           |  |   | X   |   |   |   |  |          |                                      |
| 4  | JO-PTC-001-091517-11.5-13.5             | 9/15/17 12:00 | SOIL               | 1                    |                 |                           |  |   | X   |   |   |   |  |          |                                      |
| 5  | JO-PTC-001-091517-23.0-25.0             | 9/15/17 12:20 | SOIL               | 1                    |                 |                           |  |   | X   |   |   |   |  |          |                                      |
| 6  | JO-PTC-001-091517-31.5-33.5             | 9/15/17 11:20 | SOIL               | 1                    |                 |                           |  |   | X   |   |   |   |  |          |                                      |
| 7  |   |               |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 8  |   |               |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 9  |   |               |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 10   |   |               |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   | 9/15/17       |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <i>Lauren Miller</i>  | Date: <del>9/14/17</del>                | Time: 12:35   | Relinquished By:   | Date:                | Time:           | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |
| Received By: <i>Armando Amato</i>  | Date: 9.15.17                           | Time: 12:35   |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |

Page 1 of 1

List Hazardous Contaminants: \_\_\_\_\_

samples@brooksapplied.com | brooksapplied.com

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**BROOKS  
APPLIED  
LABS**

# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466 / *L. Kerner*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Lawson* For BAL Use Only Date: *9/21/17* BAL Report 1839006  
 Work Order ID: \_\_\_\_\_ Time: *9:10*  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection                  |                   | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |
|---|-----------------------------|-------------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|
|   | Date                        | Time              | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Specify Here                |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| Sample ID   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 1   | SO-PTC-129-092017-10.0-12.0 | 9/20/17 1315      | SOIL                      | 1                    |                 |                   | X  | X   | X   |   |   |   |  |          |
| 2   | SO-PTC-129-092017-17.3-20.0 | 9/20/17 1320      | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |          |
| 3   | SO-PTC-129-092017-22.5-25.0 | 9/20/17 1325      | SOIL                      | 1                    |                 |                   | X  | X   | X   |   |   |   |  |          |
| 4   | SO-PTC-129-092017-35.8-36.5 | 9/20/17 1500      | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |          |
| 5   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 6   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 7   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 8   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 9   |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| 10  |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| Trip Blank (specify)  |                             |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |
| Relinquished By: <i>[Signature]</i>   | Date: <i>9/21/17</i>        | Time: <i>9:10</i> | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |  |          |
| Received By: <i>[Signature]</i>   | Date: <i>9/21/17</i>        | Time: <i>9:10</i> | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |  |          |

Page \_\_\_\_ of \_\_\_\_ List Hazardous Contaminants: \_\_\_\_\_

samples@brooksupplied.com | brooksupplied.com

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# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

For BAL use only  
 Received by: [Signature] Date: 10/6/17  
 Work Order ID: \_\_\_\_\_ Time: 12:30  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |                      | Client Sample Info |                      |                 |                                 | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|----------------------|--------------------|----------------------|-----------------|---------------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type               | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          | Specify Here                         |
| 1  | SD-120+75-ST1-SED-100417-0-0.33         | 10/4/17              | 1330               | SOIL                 | 1               |                                 |  |   |   | X   |   |   |  |          |                                      |
| 2  | SD-175+00-ST1-SED-100417-1-0.33         | ↓                    | 1430               | SOIL                 | 1               |                                 |  |   |   | X   |   |   |  |          |                                      |
| 3  | SD-128+50-ST1-SED-100417-0-0.33         | ↓                    | 1530               | SOIL                 | 1               |                                 |  |   |   | X   |   |   |  |          |                                      |
| 4  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 5  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 6  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 7  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 8  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 9  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| 10   |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>[Signature]</u>  |   | Date: <u>10/6/17</u> |                    | Time: _____          |                 | Relinquished By: _____          |  |   |   | Date: _____   |   | Time: _____   |  |          |                                      |
| Received By: _____   |   | Date: _____          |                    | Time: _____          |                 | Total Number of Packages: _____ |  |   |   |   |   |   |  |          |                                      |

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**Data Gap #2D**  
**2017 Batch Adsorption (BAL)**





18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

May 8, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

Revision 1: Some of the sample collection dates and receipt dates were incorrect in the initial report issued on March 21, 2018. The dates have been corrected in this revised report and associated revised EDD. No other changes have been made with respect to the original report.

RE: Project PTC-OA1701

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On September 13<sup>th</sup> through October 3<sup>rd</sup>, 2017, Brooks Applied Labs (BAL) received seventeen (17) soil/sediment samples. All samples were received and stored according to BAL SOPs and EPA methodology.

All samples were stored and prepped anoxically in an oxygen free glove box. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

Shortly after receipt, all submitted core samples were unpacked in a glove box maintained under anoxic conditions, split into appropriate sample containers, and then stored according to BAL SOPs. All sample fractions designated for batch adsorption testing (BAT) were frozen pending the client's decision on which samples to analyze. The client notified BAL that the client sample SO-PTC-001-091517-23.0-25.0 should undergo Batch Adsorption Testing (BAT), in accordance with the procedure submitted by the client. This report only contains the BAT results for SO-PTC-001-091517-23.0-25.0.

#### Batch Adsorption Testing (BAT)

Prior to the BAT, the soil sample was dried in a glove box maintained under anoxic conditions and then sieved using a 2mm mesh size. An aliquot of each sieved sample was then taken for dry weight determination; in accordance with the BAT protocol, the resulting dry weights were used to calculate the appropriate sample masses required for the testing. All subsequent testing was performed on the original sieved sample portions.

In accordance with the client instructions, sixteen (16) separate synthetic groundwaters were prepared for the BAT. Reagent solutions were degassed with an N<sub>2</sub> purge prior to use. All solutions were initially prepared as NaCl solutions with a total dissolved solids (TDS) = 4030. A carbonate buffer was added to half of the solutions. The resulting solutions were spiked with As(III) and As(V) spikes according to the following table.

**Spiked GW Solutions**

| Associated Client Sample ID                          | Synthetic GW pH Control   | Soil: Solution Ratio, Equilibration Time           | Arsenic Spikes Used in Synthetic GW                                       |
|--|---|--|---|
| 1809005-19<br>1809005-20<br>1809005-21<br>1809005-22 | No Buffer in Synthetic GW   | 1:10 Solution Ratio, 72 hrs.<br>Equilibration Time | 0.4 mg/L As(III)<br>1 mg/L As(III)<br>5 mg/L As (III)<br>20 mg/L As (III) |
| 1809005-23<br>1809005-24<br>1809005-25<br>1809005-26 | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(III)<br>1 mg/L As(III)<br>5 mg/L As (III)<br>20 mg/L As (III) |
| 1809005-27<br>1809005-28<br>1809005-29<br>1809005-30 | No Buffer in Synthetic GW   |  | 0.4 mg/L As(V)<br>1 mg/L As(V)<br>5 mg/L As (V)<br>20 mg/L As (V)         |
| 1809005-31<br>1809005-32<br>1809005-33<br>1809005-34 | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(V)<br>1 mg/L As(V)<br>5 mg/L As (V)<br>20 mg/L As (V)         |

An aliquot of each spiked synthetic groundwater solution was split into a separate container, acidified to a pH < 2 with nitric acid, and then analyzed for determination of the initial arsenic concentration. These fractions are identified as blank spike samples in the attached *Accuracy and Precision* tables.

Aliquots of the spiked synthetic groundwater were also added to empty sample containers and extracted alongside the client samples to monitor for potential losses during the extraction procedure. These fractions are identified as method blank samples in the attached *Accuracy and Precision* tables.

Aliquots of the remaining spiked synthetic groundwater were added to an appropriate mass of each sample to achieve the requested soil: solution ratio of 1:10. For each type of spiked synthetic groundwater, a matrix duplicate sample has been prepped with SO-PTC-001-091517-23.0-25.0 at the

same soil: solution ratio. The following table describes the associated QC samples, and the source sample each QC sample is associated with.

**QC Sample ID Cross Reference Table**

| Sample ID  | Associated Duplicate Sample | Method Blank Sample* | Blank Spike Sample** |
|------------|-----------------------------|----------------------|----------------------|
| 1809005-19 | DUP1                        | BLK1                 | BS1                  |
| 1809005-20 | DUP2                        | BLK2                 | BS2                  |
| 1809005-21 | DUP3                        | BLK3                 | BS3                  |
| 1809005-22 | DUP4                        | BLK4                 | BS4                  |
| 1809005-23 | DUP5                        | BLK5                 | BS5                  |
| 1809005-24 | DUP6                        | BLK6                 | BS6                  |
| 1809005-25 | DUP7                        | BLK7                 | BS7                  |
| 1809005-26 | DUP8                        | BLK8                 | BS8                  |
| 1809005-27 | DUP9                        | BLK9                 | BS9                  |
| 1809005-28 | DUPA                        | BLKA                 | BSA                  |
| 1809005-29 | DUPB                        | BLKB                 | BSB                  |
| 1809005-30 | DUPC                        | BLKC                 | BSC                  |
| 1809005-31 | DUPD                        | BLKD                 | BSD                  |
| 1809005-32 | DUPE                        | BLKE                 | BSE                  |
| 1809005-33 | DUPF                        | BLKF                 | BSF                  |
| 1809005-34 | DUPG                        | BLKG                 | BSG                  |

\*Method Blank Sample = Spiked Synthetic GW (method blank sample subjected to tumbling step - same as client samples).

\*\* Blank Spike Sample = Spiked Synthetic GW (not subjected to tumbling step).

All prepared samples were then placed on a rotary tumbler (kept inside the glove box) and allowed to tumble for 72 hours. After the designed equilibration time had elapsed an aliquot of each resulting extract was filtered (0.45µm), acidified to a pH < 2 with nitric acid, and then reserved for dissolved As analysis. The remaining extract for each sample was evaluated for pH and temperature.

#### pH and Temperature Measurements

The pH of all extracts was measured via a modified SM2540B using a calibrated pH electrode.

The measured values for pH and temperature are included in the results section of the report.

#### Total Metals Quantitation of the BAT Extracts

An aliquot of each extract was directly analyzed for As using inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website.

A matrix duplicate (MD) was performed for each designated spiked synthetic groundwater. Due to the nature of the BAT, no matrix spikes could be performed during the extraction procedure. Instead,

analytical spikes (designated as B18xxx-PSx) were prepared at the time of analysis to demonstrate the accuracy of the analyses.

The results are reported using a BAT (Solids) basis, where the masses and volumes used in the batch absorption tumbling step are factored into the final results (Batch B180696). The results are also reported by BAT (Aqueous) basis, where the final results are reported using the values obtained by direct analysis of the filtered aqueous fractions from the batch absorption test (Batch B180558).

Arsenic recoveries for all method blanks and blank spike samples were within acceptable ranges.

Several continuous calibration blank (CCB) samples yielded arsenic results greater than the associated MRLs. In all cases the bracketed samples were greater than 10x the elevated CCB result; the elevated CCBs should have minimal impact on data quality. Consequently, no qualification of data is required.

The results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

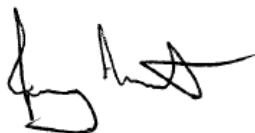
In instances where a matrix spike/matrix spike duplicate (MS/MSD) set was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

All data was reported without qualification and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jeremy Maute', with a stylized flourish at the end.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Please see narrative for explanation.                                      |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.                               |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Please see narrative for explanation.  |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---|------------|---------------|--------|------------|------------|
| SO-PTC-002-091317-2.0-4.0                               | 1809005-01 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-13.0-15.0                             | 1809005-02 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0                             | 1809005-03 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-31.0-33.0                             | 1809005-04 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-001-091517-2.5-4.5                               | 1809005-05 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5                             | 1809005-06 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0                             | 1809005-07 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-31.5-33.5                             | 1809005-08 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-129-092017-10.0-12.0                             | 1809005-09 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-17.3-20.0                             | 1809005-10 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-22.5-25.0                             | 1809005-11 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-35.8-36.5                             | 1809005-12 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| GW-713-2-092117-(20)                                    | 1809005-13 | Water-D       | Sample | 09/21/2017 | 09/21/2017 |
| SO-122+60-0-SED-100317-0-0.33                           | 1809005-14 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-125+50-0-SED-100317-0-0.33                           | 1809005-15 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-120+75-ST1-SED-100417-0-0.33                         | 1809005-16 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33                         | 1809005-17 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-128+50-ST1-SED-100417-0-0.33                         | 1809005-18 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 0.4 mg/L As(III)   | 1809005-19 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 1 mg/L As(III)     | 1809005-20 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 5 mg/L As(III)     | 1809005-21 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 20 mg/L As(III)    | 1809005-22 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 0.4 mg/L As(III) | 1809005-23 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 1 mg/L As(III)   | 1809005-24 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 5 mg/L As(III)   | 1809005-25 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 20 mg/L As(III)  | 1809005-26 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 0.4 mg/L As(V)     | 1809005-27 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 1 mg/L As(V)       | 1809005-28 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 5 mg/L As(V)       | 1809005-29 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 20 mg/L As(V)      | 1809005-30 | Soil          | Sample | 09/15/2017 | 09/15/2017 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Information

| Sample  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---|------------|---------------|--------|------------|------------|
| SO-PTC-001-091517-23.0-25.0_With Buff, 0.4 mg/L As(V) | 1809005-31 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 1 mg/L As(V)   | 1809005-32 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 5 mg/L As(V)   | 1809005-33 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 20 mg/L As(V)  | 1809005-34 | Soil          | Sample | 09/15/2017 | 09/15/2017 |



## Batch Summary

| Analyte | Lab Matrix    | Method        | Prepared   | Analyzed   | Batch   | Sequence |
|---------|---------------|---------------|------------|------------|---------|----------|
| %TS     | Soil/Sediment | SM 2540G      | 03/12/2018 | 03/14/2018 | B180556 | N/A      |
| As(BAT) | Water         | EPA 1638 Mod  | 03/13/2018 | 03/19/2018 | B180558 | 1800391  |
| As(BAT) | Soil/Sediment | EPA 6020B Mod | 03/13/2018 | 03/19/2018 | B180696 | 1800391  |
| pH      | Soil/Sediment | EPA 150.1     | 03/13/2018 | 03/19/2018 | B180557 | N/A      |

BAT = Batch Absorption Testing

B180558: BAT Results in terms of ug/L (*i.e.. direct analysis of BAT fractions*).

B180696: BAT Results in terms of mg/kg dry (*i.e.. mass employed in BAT and %TS used to calculate results*).]





## Sample Results

| Sample   | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit         | Batch   | Sequence |
|--|---------|---------------|-------|--------|-----------|-------|-------|--------------|---------|----------|
| <b>SO-PTC-001-091517-23.0-25.0_No Buff, 0.4 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-19   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02  | %            | B180556 | N/A      |
| 1809005-19   | As(BAT) | Soil          | dry   | 227    |           | 0.100 | 1.00  | µg/L         | B180558 | 1800391  |
| 1809005-19   | As(BAT) | Soil          | dry   | 2.26   |           | 0.100 | 0.996 | mg/kg        | B180696 | 1800391  |
| 1809005-19   | pH      | Soil          | dry   | 8.41   |           |       |       | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_No Buff, 1 mg/L As(III)</b>     |         |               |       |        |           |       |       |              |         |          |
| 1809005-20   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02  | %            | B180556 | N/A      |
| 1809005-20   | As(BAT) | Soil          | dry   | 648    |           | 0.100 | 1.00  | µg/L         | B180558 | 1800391  |
| 1809005-20   | As(BAT) | Soil          | dry   | 6.50   |           | 0.100 | 1.00  | mg/kg        | B180696 | 1800391  |
| 1809005-20   | pH      | Soil          | dry   | 8.53   |           |       |       | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_No Buff, 5 mg/L As(III)</b>     |         |               |       |        |           |       |       |              |         |          |
| 1809005-21   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02  | %            | B180556 | N/A      |
| 1809005-21   | As(BAT) | Soil          | dry   | 3840   |           | 0.400 | 4.00  | µg/L         | B180558 | 1800391  |
| 1809005-21   | As(BAT) | Soil          | dry   | 38.6   |           | 0.402 | 4.02  | mg/kg        | B180696 | 1800391  |
| 1809005-21   | pH      | Soil          | dry   | 8.49   |           |       |       | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_No Buff, 20 mg/L As(III)</b>    |         |               |       |        |           |       |       |              |         |          |
| 1809005-22   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02  | %            | B180556 | N/A      |
| 1809005-22   | As(BAT) | Soil          | dry   | 16700  |           | 1.00  | 10.0  | µg/L         | B180558 | 1800391  |
| 1809005-22   | As(BAT) | Soil          | dry   | 167    |           | 1.00  | 10.0  | mg/kg        | B180696 | 1800391  |
| 1809005-22   | pH      | Soil          | dry   | 8.21   |           |       |       | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_With Buff, 0.4 mg/L As(III)</b> |         |               |       |        |           |       |       |              |         |          |
| 1809005-23   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02  | %            | B180556 | N/A      |
| 1809005-23   | As(BAT) | Soil          | dry   | 330    |           | 0.100 | 1.00  | µg/L         | B180558 | 1800391  |
| 1809005-23   | As(BAT) | Soil          | dry   | 3.31   |           | 0.100 | 1.00  | mg/kg        | B180696 | 1800391  |
| 1809005-23   | pH      | Soil          | dry   | 9.63   |           |       |       | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_With Buff, 1 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-24   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02  | %            | B180556 | N/A      |
| 1809005-24   | As(BAT) | Soil          | dry   | 819    |           | 0.100 | 1.00  | µg/L         | B180558 | 1800391  |
| 1809005-24   | As(BAT) | Soil          | dry   | 8.14   |           | 0.099 | 0.994 | mg/kg        | B180696 | 1800391  |
| 1809005-24   | pH      | Soil          | dry   | 9.63   |           |       |       | pH units dry | B180557 | N/A      |



## Sample Results

| Sample   | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL  | Unit         | Batch   | Sequence |
|--|---------|---------------|-------|--------|-----------|-------|------|--------------|---------|----------|
| <b>SO-PTC-001-091517-23.0-25.0_ With Buff, 5 mg/L As(III)</b>  |         |               |       |        |           |       |      |              |         |          |
| 1809005-25   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-25   | As(BAT) | Soil          | dry   | 4190   |           | 0.400 | 4.00 | µg/L         | B180558 | 1800391  |
| 1809005-25   | As(BAT) | Soil          | dry   | 42.0   |           | 0.401 | 4.01 | mg/kg        | B180696 | 1800391  |
| 1809005-25   | pH      | Soil          | dry   | 9.63   |           |       |      | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_ With Buff, 20 mg/L As(III)</b> |         |               |       |        |           |       |      |              |         |          |
| 1809005-26   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-26   | As(BAT) | Soil          | dry   | 18900  |           | 1.00  | 10.0 | µg/L         | B180558 | 1800391  |
| 1809005-26   | As(BAT) | Soil          | dry   | 190    |           | 1.00  | 10.0 | mg/kg        | B180696 | 1800391  |
| 1809005-26   | pH      | Soil          | dry   | 9.61   |           |       |      | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_ No Buff, 0.4 mg/L As(V)</b>    |         |               |       |        |           |       |      |              |         |          |
| 1809005-27   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-27   | As(BAT) | Soil          | dry   | 247    |           | 0.100 | 1.00 | µg/L         | B180558 | 1800391  |
| 1809005-27   | As(BAT) | Soil          | dry   | 2.47   |           | 0.100 | 1.00 | mg/kg        | B180696 | 1800391  |
| 1809005-27   | pH      | Soil          | dry   | 8.78   |           |       |      | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_ No Buff, 1 mg/L As(V)</b>      |         |               |       |        |           |       |      |              |         |          |
| 1809005-28   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-28   | As(BAT) | Soil          | dry   | 663    |           | 0.100 | 1.00 | µg/L         | B180558 | 1800391  |
| 1809005-28   | As(BAT) | Soil          | dry   | 6.66   |           | 0.100 | 1.00 | mg/kg        | B180696 | 1800391  |
| 1809005-28   | pH      | Soil          | dry   | 8.53   |           |       |      | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_ No Buff, 5 mg/L As(V)</b>      |         |               |       |        |           |       |      |              |         |          |
| 1809005-29   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-29   | As(BAT) | Soil          | dry   | 3720   |           | 0.400 | 4.00 | µg/L         | B180558 | 1800391  |
| 1809005-29   | As(BAT) | Soil          | dry   | 37.3   |           | 0.402 | 4.02 | mg/kg        | B180696 | 1800391  |
| 1809005-29   | pH      | Soil          | dry   | 8.50   |           |       |      | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_ No Buff, 20 mg/L As(V)</b>     |         |               |       |        |           |       |      |              |         |          |
| 1809005-30   | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-30   | As(BAT) | Soil          | dry   | 17800  |           | 1.00  | 10.0 | µg/L         | B180558 | 1800391  |
| 1809005-30   | As(BAT) | Soil          | dry   | 179    |           | 1.00  | 10.0 | mg/kg        | B180696 | 1800391  |
| 1809005-30   | pH      | Soil          | dry   | 8.59   |           |       |      | pH units dry | B180557 | N/A      |



## Sample Results

| Sample  | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL  | Unit         | Batch   | Sequence |
|---|---------|---------------|-------|--------|-----------|-------|------|--------------|---------|----------|
| <b>SO-PTC-001-091517-23.0-25.0_ With Buff, 0.4 mg/L As(V)</b> |         |               |       |        |           |       |      |              |         |          |
| 1809005-31  | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-31  | As(BAT) | Soil          | dry   | 329    |           | 0.100 | 1.00 | µg/L         | B180558 | 1800391  |
| 1809005-31  | As(BAT) | Soil          | dry   | 3.31   |           | 0.100 | 1.00 | mg/kg        | B180696 | 1800391  |
| 1809005-31  | pH      | Soil          | dry   | 9.62   |           |       |      | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_ With Buff, 1 mg/L As(V)</b>   |         |               |       |        |           |       |      |              |         |          |
| 1809005-32  | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-32  | As(BAT) | Soil          | dry   | 804    |           | 0.100 | 1.00 | µg/L         | B180558 | 1800391  |
| 1809005-32  | As(BAT) | Soil          | dry   | 8.04   |           | 0.100 | 1.00 | mg/kg        | B180696 | 1800391  |
| 1809005-32  | pH      | Soil          | dry   | 9.62   |           |       |      | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_ With Buff, 5 mg/L As(V)</b>   |         |               |       |        |           |       |      |              |         |          |
| 1809005-33  | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-33  | As(BAT) | Soil          | dry   | 4150   |           | 0.400 | 4.00 | µg/L         | B180558 | 1800391  |
| 1809005-33  | As(BAT) | Soil          | dry   | 41.1   |           | 0.396 | 3.96 | mg/kg        | B180696 | 1800391  |
| 1809005-33  | pH      | Soil          | dry   | 9.62   |           |       |      | pH units dry | B180557 | N/A      |
| <b>SO-PTC-001-091517-23.0-25.0_ With Buff, 20 mg/L As(V)</b>  |         |               |       |        |           |       |      |              |         |          |
| 1809005-34  | %TS     | Soil          | NA    | 99.49  |           | 0.005 | 0.02 | %            | B180556 | N/A      |
| 1809005-34  | As(BAT) | Soil          | dry   | 18300  |           | 1.00  | 10.0 | µg/L         | B180558 | 1800391  |
| 1809005-34  | As(BAT) | Soil          | dry   | 184    |           | 1.00  | 10.0 | mg/kg        | B180696 | 1800391  |
| 1809005-34  | pH      | Soil          | dry   | 9.63   |           |       |      | pH units dry | B180557 | N/A      |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Results

### pH Measurements Summary

| pH Measurements Summary |      |           |             |      |           | Batch: B180557   |  |                                     |
|-------------------------|------|-----------|-------------|------|-----------|--|--|-------------------------------------|
| Sample ID               | pH   | Temp (°C) | Sample ID   | pH   | Temp (°C) | Synthetic GW pH Control  | Soil:Solution Ratio, Equilibration Time        | Arsenic Spikes Used in Synthetic GW |
| B180558-BLK1            | 5.21 | 22.7      | B180558-BS1 | 5.23 | 21.8      | No Buffer in Synthetic GW  | 1:10 Solution Ratio, 72 hrs Equilibration Time | 0.4 mg/L As(III)                    |
| B180558-BLK2            | 5.88 | 22.9      | B180558-BS2 | 5.97 | 22.0      |  |  | 1 mg/L As(III)                      |
| B180558-BLK3            | 8.88 | 23.1      | B180558-BS3 | 8.74 | 22.1      |  |  | 5 mg/L As (III)                     |
| B180558-BLK4            | 9.46 | 22.9      | B180558-BS4 | 9.52 | 22.1      |  |  | 20 mg/L As (III)                    |
| B180558-BLK5            | 9.78 | 22.9      | B180558-BS5 | 9.83 | 22.0      | 0.01 M Na <sub>2</sub> CO <sub>3</sub> /<br>0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(III)                    |
| B180558-BLK6            | 9.79 | 22.8      | B180558-BS6 | 9.84 | 22.0      |  |  | 1 mg/L As(III)                      |
| B180558-BLK7            | 9.80 | 22.9      | B180558-BS7 | 9.84 | 22.0      |  |  | 5 mg/L As (III)                     |
| B180558-BLK8            | 9.81 | 22.8      | B180558-BS8 | 9.86 | 22.0      |  |  | 20 mg/L As (III)                    |
| B180558-BLK9            | 7.69 | 22.9      | B180558-BS9 | 7.86 | 22.1      | No Buffer in Synthetic GW  |  | 0.4 mg/L As(V)                      |
| B180558-BLKA            | 7.11 | 22.8      | B180558-BSA | 6.90 | 22.1      |  |  | 1 mg/L As(V)                        |
| B180558-BLKB            | 7.15 | 22.9      | B180558-BSB | 7.12 | 22.1      |  |  | 5 mg/L As (V)                       |
| B180558-BLKC            | 7.74 | 22.9      | B180558-BSC | 7.75 | 22.2      |  |  | 20 mg/L As (V)                      |
| B180558-BLKD            | 9.80 | 22.8      | B180558-BSD | 9.84 | 22.1      | 0.01 M Na <sub>2</sub> CO <sub>3</sub> /<br>0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW | 0.4 mg/L As(V)                                 |                                     |
| B180558-BLKE            | 9.81 | 22.8      | B180558-BSE | 9.86 | 22.1      |  | 1 mg/L As(V)                                   |                                     |
| B180558-BLKF            | 9.81 | 22.7      | B180558-BSF | 9.86 | 22.0      |  | 5 mg/L As (V)                                  |                                     |
| B180558-BLKG            | 9.81 | 22.7      | B180558-BSG | 9.88 | 22.0      |  | 20 mg/L As (V)                                 |                                     |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Results

### pH Measurements Summary

| pH Measurements Summary |      |           |              |      |           | Batch: B180557   |  |                                     |
|-------------------------|------|-----------|--------------|------|-----------|--|--|-------------------------------------|
| Sample ID               | pH   | Temp (°C) | Sample ID    | pH   | Temp (°C) | Synthetic GW pH Control  | Soil:Solution Ratio, Equilibration Time        | Arsenic Spikes Used in Synthetic GW |
| 1809005-19              | 8.41 | 22.3      | B180558-DUP1 | 8.81 | 22.6      | No Buffer in Synthetic GW  | 1:10 Solution Ratio, 72 hrs Equilibration Time | 0.4 mg/L As(III)                    |
| 1809005-20              | 8.53 | 22.6      | B180558-DUP2 | 8.56 | 22.6      |  |  | 1 mg/L As(III)                      |
| 1809005-21              | 8.49 | 22.6      | B180558-DUP3 | 8.45 | 22.6      |  |  | 5 mg/L As (III)                     |
| 1809005-22              | 8.21 | 22.6      | B180558-DUP4 | 8.18 | 22.6      |  |  | 20 mg/L As (III)                    |
| 1809005-23              | 9.63 | 22.6      | B180558-DUP5 | 9.61 | 22.6      | 0.01 M Na <sub>2</sub> CO <sub>3</sub> /<br>0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(III)                    |
| 1809005-24              | 9.63 | 22.5      | B180558-DUP6 | 9.62 | 22.5      |  |  | 1 mg/L As(III)                      |
| 1809005-25              | 9.63 | 22.6      | B180558-DUP7 | 9.62 | 22.5      |  |  | 5 mg/L As (III)                     |
| 1809005-26              | 9.61 | 22.5      | B180558-DUP8 | 9.61 | 22.5      |  |  | 20 mg/L As (III)                    |
| 1809005-27              | 8.78 | 22.7      | B180558-DUP9 | 8.73 | 22.7      | No Buffer in Synthetic GW  |  | 0.4 mg/L As(V)                      |
| 1809005-28              | 8.53 | 22.7      | B180558-DUPA | 8.52 | 22.7      |  |  | 1 mg/L As(V)                        |
| 1809005-29              | 8.50 | 22.8      | B180558-DUPB | 8.51 | 22.8      |  |  | 5 mg/L As (V)                       |
| 1809005-30              | 8.59 | 22.9      | B180558-DUPC | 8.59 | 22.8      |  |  | 20 mg/L As (V)                      |
| 1809005-31              | 9.62 | 22.8      | B180558-DUPD | 9.61 | 22.8      | 0.01 M Na <sub>2</sub> CO <sub>3</sub> /<br>0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(V)                      |
| 1809005-32              | 9.62 | 22.8      | B180558-DUPE | 9.62 | 22.9      |  |  | 1 mg/L As(V)                        |
| 1809005-33              | 9.62 | 22.6      | B180558-DUPF | 9.62 | 22.0      |  |  | 5 mg/L As (V)                       |
| 1809005-34              | 9.63 | 22.7      | B180558-DUPG | 9.62 | 22.7      |  |  | 20 mg/L As (V)                      |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B180556  
**Lab Matrix:** Soil/Sediment  
**Method:** SM 2540G

| Sample       | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180556-DUP1 | Duplicate, (1809005-19)<br>%TS | 99.49  |       | 99.49  | %     |              | 0% 15        |



## Accuracy & Precision Summary

Batch: B180557  
 Lab Matrix: Soil/Sediment  
 Method: EPA 150.1

| Sample       | Analyte                       | Native | Spike | Result | Units        | REC & Limits | RPD & Limits |
|--------------|-------------------------------|--------|-------|--------|--------------|--------------|--------------|
| B180557-DUP1 | Duplicate, (1809005-19)<br>pH | 8.41   |       | 8.81   | pH units dry |              | 5% 200       |
| B180557-DUP2 | Duplicate, (1809005-20)<br>pH | 8.53   |       | 8.56   | pH units dry |              | 0.4% 200     |
| B180557-DUP3 | Duplicate, (1809005-21)<br>pH | 8.49   |       | 8.45   | pH units dry |              | 0.5% 200     |
| B180557-DUP4 | Duplicate, (1809005-22)<br>pH | 8.21   |       | 8.18   | pH units dry |              | 0.4% 200     |
| B180557-DUP5 | Duplicate, (1809005-23)<br>pH | 9.63   |       | 9.61   | pH units dry |              | 0.2% 200     |
| B180557-DUP6 | Duplicate, (1809005-24)<br>pH | 9.63   |       | 9.62   | pH units dry |              | 0.1% 200     |
| B180557-DUP7 | Duplicate, (1809005-25)<br>pH | 9.63   |       | 9.62   | pH units dry |              | 0.1% 200     |
| B180557-DUP8 | Duplicate, (1809005-26)<br>pH | 9.61   |       | 9.61   | pH units dry |              | 0% 200       |
| B180557-DUP9 | Duplicate, (1809005-27)<br>pH | 8.78   |       | 8.73   | pH units dry |              | 0.6% 200     |
| B180557-DUPA | Duplicate, (1809005-28)<br>pH | 8.53   |       | 8.52   | pH units dry |              | 0.1% 200     |
| B180557-DUPB | Duplicate, (1809005-29)<br>pH | 8.50   |       | 8.51   | pH units dry |              | 0.1% 200     |
| B180557-DUPC | Duplicate, (1809005-30)<br>pH | 8.59   |       | 8.59   | pH units dry |              | 0% 200       |



## Accuracy & Precision Summary

Batch: B180557  
Lab Matrix: Soil/Sediment  
Method: EPA 150.1

| Sample       | Analyte                       | Native | Spike | Result | Units        | REC & Limits | RPD & Limits |
|--------------|-------------------------------|--------|-------|--------|--------------|--------------|--------------|
| B180557-DUPD | Duplicate, (1809005-31)<br>pH | 9.62   |       | 9.61   | pH units dry |              | 0.1% 200     |
| B180557-DUPE | Duplicate, (1809005-32)<br>pH | 9.62   |       | 9.62   | pH units dry |              | 0% 200       |
| B180557-DUPF | Duplicate, (1809005-33)<br>pH | 9.62   |       | 9.62   | pH units dry |              | 0% 200       |
| B180557-DUPG | Duplicate, (1809005-34)<br>pH | 9.63   |       | 9.62   | pH units dry |              | 0.1% 200     |





## Accuracy & Precision Summary

Batch: B180558  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample      | Analyte                           | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|-----------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180558-BS1 | Blank Spike, (1810006)<br>As(BAT) |        | 402.4 | 373.0  | µg/L  | 93% 75-125   |              |
| B180558-BS2 | Blank Spike, (1810006)<br>As(BAT) |        | 996.5 | 947.9  | µg/L  | 95% 75-125   |              |
| B180558-BS3 | Blank Spike, (1810006)<br>As(BAT) |        | 4983  | 4319   | µg/L  | 87% 75-125   |              |
| B180558-BS4 | Blank Spike, (1810006)<br>As(BAT) |        | 20120 | 16900  | µg/L  | 84% 75-125   |              |
| B180558-BS5 | Blank Spike, (1810006)<br>As(BAT) |        | 402.4 | 391.0  | µg/L  | 97% 75-125   |              |
| B180558-BS6 | Blank Spike, (1810006)<br>As(BAT) |        | 996.5 | 948.8  | µg/L  | 95% 75-125   |              |
| B180558-BS7 | Blank Spike, (1810006)<br>As(BAT) |        | 4983  | 4399   | µg/L  | 88% 75-125   |              |
| B180558-BS8 | Blank Spike, (1810006)<br>As(BAT) |        | 20120 | 17760  | µg/L  | 88% 75-125   |              |
| B180558-BS9 | Blank Spike, (1810007)<br>As(BAT) |        | 396.2 | 408.7  | µg/L  | 103% 75-125  |              |
| B180558-BSA | Blank Spike, (1810007)<br>As(BAT) |        | 981.1 | 1008   | µg/L  | 103% 75-125  |              |
| B180558-BSB | Blank Spike, (1810007)<br>As(BAT) |        | 4906  | 4974   | µg/L  | 101% 75-125  |              |
| B180558-BSC | Blank Spike, (1810007)<br>As(BAT) |        | 19810 | 19350  | µg/L  | 98% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180558  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180558-BSD  | Blank Spike, (1810007)<br>As(BAT)   |        | 396.2 | 410.6  | µg/L  | 104% 75-125  |              |
| B180558-BSE  | Blank Spike, (1810007)<br>As(BAT)   |        | 981.1 | 1014   | µg/L  | 103% 75-125  |              |
| B180558-BSF  | Blank Spike, (1810007)<br>As(BAT)   |        | 4906  | 4937   | µg/L  | 101% 75-125  |              |
| B180558-BSG  | Blank Spike, (1810007)<br>As(BAT)   |        | 19810 | 19710  | µg/L  | 100% 75-125  |              |
| B180558-DUP1 | Duplicate, (1809005-19)<br>As(BAT)  | 227.3  |       | 222.8  | µg/L  |              | 2% 20        |
| B180558-PS1  | Post Spike, (1809005-19)<br>As(BAT) | 227.3  | 250.0 | 485.1  | µg/L  | 103% 75-125  |              |
| B180558-PS2  | Post Spike, (1809005-19)<br>As(BAT) | 227.3  | 250.0 | 472.4  | µg/L  | 98% 75-125   |              |
| B180558-DUP2 | Duplicate, (1809005-20)<br>As(BAT)  | 647.7  |       | 652.2  | µg/L  |              | 0.7% 20      |
| B180558-PS3  | Post Spike, (1809005-20)<br>As(BAT) | 647.7  | 250.0 | 902.6  | µg/L  | 102% 75-125  |              |
| B180558-PS4  | Post Spike, (1809005-20)<br>As(BAT) | 647.7  | 250.0 | 907.2  | µg/L  | 104% 75-125  |              |
| B180558-DUP3 | Duplicate, (1809005-21)<br>As(BAT)  | 3843   |       | 3894   | µg/L  |              | 1% 20        |
| B180558-PS5  | Post Spike, (1809005-21)<br>As(BAT) | 3843   | 1000  | 4786   | µg/L  | 94% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180558  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180558-PS6  | Post Spike, (1809005-21)<br>As(BAT) | 3843   | 1000  | 4851   | µg/L  | 101% 75-125  |              |
| B180558-DUP4 | Duplicate, (1809005-22)<br>As(BAT)  | 16690  |       | 16750  | µg/L  |              | 0.4% 20      |
| B180558-PS7  | Post Spike, (1809005-22)<br>As(BAT) | 16690  | 2500  | 19440  | µg/L  | 110% 75-125  |              |
| B180558-PS8  | Post Spike, (1809005-22)<br>As(BAT) | 16690  | 2500  | 19400  | µg/L  | 108% 75-125  |              |
| B180558-DUP5 | Duplicate, (1809005-23)<br>As(BAT)  | 329.9  |       | 323.3  | µg/L  |              | 2% 20        |
| B180558-PS9  | Post Spike, (1809005-23)<br>As(BAT) | 329.9  | 250.0 | 582.2  | µg/L  | 101% 75-125  |              |
| B180558-PSA  | Post Spike, (1809005-23)<br>As(BAT) | 329.9  | 250.0 | 583.1  | µg/L  | 101% 75-125  |              |
| B180558-DUP6 | Duplicate, (1809005-24)<br>As(BAT)  | 818.5  |       | 824.9  | µg/L  |              | 0.8% 20      |
| B180558-PSB  | Post Spike, (1809005-24)<br>As(BAT) | 818.5  | 250.0 | 1079   | µg/L  | 104% 75-125  |              |
| B180558-PSC  | Post Spike, (1809005-24)<br>As(BAT) | 818.5  | 250.0 | 1076   | µg/L  | 103% 75-125  |              |
| B180558-DUP7 | Duplicate, (1809005-25)<br>As(BAT)  | 4192   |       | 4199   | µg/L  |              | 0.2% 20      |
| B180558-PSD  | Post Spike, (1809005-25)<br>As(BAT) | 4192   | 1000  | 5223   | µg/L  | 103% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180558  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180558-PSE  | Post Spike, (1809005-25)<br>As(BAT) | 4192   | 1000  | 5215   | µg/L  | 102% 75-125  |              |
| B180558-DUP8 | Duplicate, (1809005-26)<br>As(BAT)  | 18940  |       | 18910  | µg/L  |              | 0.2% 20      |
| B180558-PSF  | Post Spike, (1809005-26)<br>As(BAT) | 18940  | 2500  | 21330  | µg/L  | 96% 75-125   |              |
| B180558-PSG  | Post Spike, (1809005-26)<br>As(BAT) | 18940  | 2500  | 21390  | µg/L  | 98% 75-125   |              |
| B180558-DUP9 | Duplicate, (1809005-27)<br>As(BAT)  | 247.0  |       | 245.7  | µg/L  |              | 0.5% 20      |
| B180558-PSH  | Post Spike, (1809005-27)<br>As(BAT) | 247.0  | 250.0 | 504.9  | µg/L  | 103% 75-125  |              |
| B180558-PSI  | Post Spike, (1809005-27)<br>As(BAT) | 247.0  | 250.0 | 508.8  | µg/L  | 105% 75-125  |              |
| B180558-DUPA | Duplicate, (1809005-28)<br>As(BAT)  | 663.2  |       | 671.6  | µg/L  |              | 1% 20        |
| B180558-PSJ  | Post Spike, (1809005-28)<br>As(BAT) | 663.2  | 250.0 | 926.5  | µg/L  | 105% 75-125  |              |
| B180558-PSK  | Post Spike, (1809005-28)<br>As(BAT) | 663.2  | 250.0 | 920.9  | µg/L  | 103% 75-125  |              |
| B180558-DUPB | Duplicate, (1809005-29)<br>As(BAT)  | 3716   |       | 3772   | µg/L  |              | 1% 20        |
| B180558-PSL  | Post Spike, (1809005-29)<br>As(BAT) | 3716   | 1000  | 4971   | µg/L  | 126% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180558  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180558-PSM  | Post Spike, (1809005-29)<br>As(BAT) | 3716   | 1000  | 5007   | µg/L  | 129% 75-125  |              |
| B180558-DUPC | Duplicate, (1809005-30)<br>As(BAT)  | 17790  |       | 17830  | µg/L  |              | 0.2% 20      |
| B180558-PSN  | Post Spike, (1809005-30)<br>As(BAT) | 17790  | 2500  | 20700  | µg/L  | 116% 75-125  |              |
| B180558-PSO  | Post Spike, (1809005-30)<br>As(BAT) | 17790  | 2500  | 20550  | µg/L  | 110% 75-125  |              |
| B180558-DUPD | Duplicate, (1809005-31)<br>As(BAT)  | 329.1  |       | 327.7  | µg/L  |              | 0.4% 20      |
| B180558-PSP  | Post Spike, (1809005-31)<br>As(BAT) | 329.1  | 250.0 | 587.1  | µg/L  | 103% 75-125  |              |
| B180558-PSQ  | Post Spike, (1809005-31)<br>As(BAT) | 329.1  | 250.0 | 585.1  | µg/L  | 102% 75-125  |              |
| B180558-DUPE | Duplicate, (1809005-32)<br>As(BAT)  | 803.7  |       | 815.8  | µg/L  |              | 1% 20        |
| B180558-PSR  | Post Spike, (1809005-32)<br>As(BAT) | 803.7  | 250.0 | 1073   | µg/L  | 108% 75-125  |              |
| B180558-PSS  | Post Spike, (1809005-32)<br>As(BAT) | 803.7  | 250.0 | 1075   | µg/L  | 109% 75-125  |              |
| B180558-DUPF | Duplicate, (1809005-33)<br>As(BAT)  | 4152   |       | 4237   | µg/L  |              | 2% 20        |
| B180558-PST  | Post Spike, (1809005-33)<br>As(BAT) | 4152   | 1000  | 5211   | µg/L  | 106% 75-125  |              |



## Accuracy & Precision Summary

**Batch:** B180558  
**Lab Matrix:** Water  
**Method:** EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180558-PSU  | Post Spike, (1809005-33)<br>As(BAT) | 4152   | 1000  | 5238   | µg/L  | 109% 75-125  |              |
| B180558-DUPG | Duplicate, (1809005-34)<br>As(BAT)  | 18350  |       | 18540  | µg/L  |              | 1% 20        |
| B180558-PSV  | Post Spike, (1809005-34)<br>As(BAT) | 18350  | 2500  | 21170  | µg/L  | 113% 75-125  |              |
| B180558-PSW  | Post Spike, (1809005-34)<br>As(BAT) | 18350  | 2500  | 21220  | µg/L  | 115% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180696  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample      | Analyte                           | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|-------------|-----------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180696-BS1 | Blank Spike, (1810006)<br>As(BAT) |        | 4.024 | 3.730  | mg/kg | 93% 75-125   |              |
| B180696-BS2 | Blank Spike, (1810006)<br>As(BAT) |        | 9.965 | 9.479  | mg/kg | 95% 75-125   |              |
| B180696-BS3 | Blank Spike, (1810006)<br>As(BAT) |        | 49.83 | 43.19  | mg/kg | 87% 75-125   |              |
| B180696-BS4 | Blank Spike, (1810006)<br>As(BAT) |        | 201.2 | 169.0  | mg/kg | 84% 75-125   |              |
| B180696-BS5 | Blank Spike, (1810006)<br>As(BAT) |        | 4.024 | 3.910  | mg/kg | 97% 75-125   |              |
| B180696-BS6 | Blank Spike, (1810006)<br>As(BAT) |        | 9.965 | 9.488  | mg/kg | 95% 75-125   |              |
| B180696-BS7 | Blank Spike, (1810006)<br>As(BAT) |        | 49.83 | 43.99  | mg/kg | 88% 75-125   |              |
| B180696-BS8 | Blank Spike, (1810006)<br>As(BAT) |        | 201.2 | 177.6  | mg/kg | 88% 75-125   |              |
| B180696-BS9 | Blank Spike, (1810007)<br>As(BAT) |        | 3.962 | 4.087  | mg/kg | 103% 75-125  |              |
| B180696-BSA | Blank Spike, (1810007)<br>As(BAT) |        | 9.811 | 10.08  | mg/kg | 103% 75-125  |              |
| B180696-BSB | Blank Spike, (1810007)<br>As(BAT) |        | 49.06 | 49.74  | mg/kg | 101% 75-125  |              |
| B180696-BSC | Blank Spike, (1810007)<br>As(BAT) |        | 198.1 | 193.5  | mg/kg | 98% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180696  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180696-BSD  | Blank Spike, (1810007)<br>As(BAT)   |        | 3.962 | 4.106  | mg/kg | 104% 75-125  |              |
| B180696-BSE  | Blank Spike, (1810007)<br>As(BAT)   |        | 9.811 | 10.14  | mg/kg | 103% 75-125  |              |
| B180696-BSF  | Blank Spike, (1810007)<br>As(BAT)   |        | 49.06 | 49.37  | mg/kg | 101% 75-125  |              |
| B180696-BSG  | Blank Spike, (1810007)<br>As(BAT)   |        | 198.1 | 197.1  | mg/kg | 100% 75-125  |              |
| B180696-DUP1 | Duplicate, (1809005-19)<br>As(BAT)  | 2.263  |       | 2.233  | mg/kg |              | 1% 30        |
| B180696-PS1  | Post Spike, (1809005-19)<br>As(BAT) | 2.263  | 2.490 | 4.831  | mg/kg | 103% 75-125  |              |
| B180696-PS2  | Post Spike, (1809005-19)<br>As(BAT) | 2.263  | 2.490 | 4.705  | mg/kg | 98% 75-125   |              |
| B180696-DUP2 | Duplicate, (1809005-20)<br>As(BAT)  | 6.503  |       | 6.553  | mg/kg |              | 0.8% 30      |
| B180696-PS3  | Post Spike, (1809005-20)<br>As(BAT) | 6.503  | 2.510 | 9.062  | mg/kg | 102% 75-125  |              |
| B180696-PS4  | Post Spike, (1809005-20)<br>As(BAT) | 6.503  | 2.510 | 9.108  | mg/kg | 104% 75-125  |              |
| B180696-DUP3 | Duplicate, (1809005-21)<br>As(BAT)  | 38.63  |       | 39.11  | mg/kg |              | 1% 30        |
| B180696-PS5  | Post Spike, (1809005-21)<br>As(BAT) | 38.63  | 10.05 | 48.10  | mg/kg | 94% 75-125   |              |





## Accuracy & Precision Summary

Batch: B180696  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180696-PS6  | Post Spike, (1809005-21)<br>As(BAT) | 38.63  | 10.05 | 48.76  | mg/kg | 101% 75-125  |              |
| B180696-DUP4 | Duplicate, (1809005-22)<br>As(BAT)  | 167.1  |       | 167.9  | mg/kg |              | 0.4% 30      |
| B180696-PS7  | Post Spike, (1809005-22)<br>As(BAT) | 167.1  | 25.03 | 194.6  | mg/kg | 110% 75-125  |              |
| B180696-PS8  | Post Spike, (1809005-22)<br>As(BAT) | 167.1  | 25.03 | 194.2  | mg/kg | 108% 75-125  |              |
| B180696-DUP5 | Duplicate, (1809005-23)<br>As(BAT)  | 3.314  |       | 3.242  | mg/kg |              | 2% 30        |
| B180696-PS9  | Post Spike, (1809005-23)<br>As(BAT) | 3.314  | 2.511 | 5.848  | mg/kg | 101% 75-125  |              |
| B180696-PSA  | Post Spike, (1809005-23)<br>As(BAT) | 3.314  | 2.511 | 5.857  | mg/kg | 101% 75-125  |              |
| B180696-DUP6 | Duplicate, (1809005-24)<br>As(BAT)  | 8.138  |       | 8.282  | mg/kg |              | 2% 30        |
| B180696-PSB  | Post Spike, (1809005-24)<br>As(BAT) | 8.138  | 2.486 | 10.73  | mg/kg | 104% 75-125  |              |
| B180696-PSC  | Post Spike, (1809005-24)<br>As(BAT) | 8.138  | 2.486 | 10.69  | mg/kg | 103% 75-125  |              |
| B180696-DUP7 | Duplicate, (1809005-25)<br>As(BAT)  | 42.00  |       | 42.02  | mg/kg |              | 0.06% 30     |
| B180696-PSD  | Post Spike, (1809005-25)<br>As(BAT) | 42.00  | 10.02 | 52.32  | mg/kg | 103% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180696  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180696-PSE  | Post Spike, (1809005-25)<br>As(BAT) | 42.00  | 10.02 | 52.24  | mg/kg | 102% 75-125  |              |
| B180696-DUP8 | Duplicate, (1809005-26)<br>As(BAT)  | 189.8  |       | 189.6  | mg/kg |              | 0.1% 30      |
| B180696-PSF  | Post Spike, (1809005-26)<br>As(BAT) | 189.8  | 25.06 | 213.9  | mg/kg | 96% 75-125   |              |
| B180696-PSG  | Post Spike, (1809005-26)<br>As(BAT) | 189.8  | 25.02 | 214.1  | mg/kg | 97% 75-125   |              |
| B180696-DUP9 | Duplicate, (1809005-27)<br>As(BAT)  | 2.471  |       | 2.466  | mg/kg |              | 0.2% 30      |
| B180696-PSH  | Post Spike, (1809005-27)<br>As(BAT) | 2.471  | 2.502 | 5.052  | mg/kg | 103% 75-125  |              |
| B180696-PSI  | Post Spike, (1809005-27)<br>As(BAT) | 2.471  | 2.506 | 5.100  | mg/kg | 105% 75-125  |              |
| B180696-DUPA | Duplicate, (1809005-28)<br>As(BAT)  | 6.664  |       | 6.722  | mg/kg |              | 0.9% 30      |
| B180696-PSJ  | Post Spike, (1809005-28)<br>As(BAT) | 6.664  | 2.512 | 9.310  | mg/kg | 105% 75-125  |              |
| B180696-PSK  | Post Spike, (1809005-28)<br>As(BAT) | 6.664  | 2.512 | 9.253  | mg/kg | 103% 75-125  |              |
| B180696-DUPB | Duplicate, (1809005-29)<br>As(BAT)  | 37.33  |       | 37.87  | mg/kg |              | 1% 30        |
| B180696-PSL  | Post Spike, (1809005-29)<br>As(BAT) | 37.33  | 10.05 | 49.94  | mg/kg | 126% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180696  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180696-PSM  | Post Spike, (1809005-29)<br>As(BAT) | 37.33  | 10.05 | 50.30  | mg/kg | 129% 75-125  |              |
| B180696-DUPC | Duplicate, (1809005-30)<br>As(BAT)  | 178.7  |       | 178.8  | mg/kg |              | 0.08% 30     |
| B180696-PSN  | Post Spike, (1809005-30)<br>As(BAT) | 178.7  | 25.10 | 207.9  | mg/kg | 116% 75-125  |              |
| B180696-PSO  | Post Spike, (1809005-30)<br>As(BAT) | 178.7  | 25.10 | 206.3  | mg/kg | 110% 75-125  |              |
| B180696-DUPD | Duplicate, (1809005-31)<br>As(BAT)  | 3.305  |       | 3.287  | mg/kg |              | 0.5% 30      |
| B180696-PSP  | Post Spike, (1809005-31)<br>As(BAT) | 3.305  | 2.511 | 5.896  | mg/kg | 103% 75-125  |              |
| B180696-PSQ  | Post Spike, (1809005-31)<br>As(BAT) | 3.305  | 2.511 | 5.876  | mg/kg | 102% 75-125  |              |
| B180696-DUPE | Duplicate, (1809005-32)<br>As(BAT)  | 8.043  |       | 8.184  | mg/kg |              | 2% 30        |
| B180696-PSR  | Post Spike, (1809005-32)<br>As(BAT) | 8.043  | 2.502 | 10.74  | mg/kg | 108% 75-125  |              |
| B180696-PSS  | Post Spike, (1809005-32)<br>As(BAT) | 8.043  | 2.502 | 10.76  | mg/kg | 109% 75-125  |              |
| B180696-DUPF | Duplicate, (1809005-33)<br>As(BAT)  | 41.06  |       | 42.48  | mg/kg |              | 3% 30        |
| B180696-PST  | Post Spike, (1809005-33)<br>As(BAT) | 41.06  | 9.890 | 51.54  | mg/kg | 106% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180696  
Lab Matrix: Soil/Sediment  
Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180696-PSU  | Post Spike, (1809005-33)<br>As(BAT) | 41.06  | 9.890 | 51.81  | mg/kg | 109% 75-125  |              |
| B180696-DUPG | Duplicate, (1809005-34)<br>As(BAT)  | 184.0  |       | 186.2  | mg/kg |              | 1% 30        |
| B180696-PSV  | Post Spike, (1809005-34)<br>As(BAT) | 184.0  | 25.07 | 212.3  | mg/kg | 113% 75-125  |              |
| B180696-PSW  | Post Spike, (1809005-34)<br>As(BAT) | 184.0  | 25.07 | 212.8  | mg/kg | 115% 75-125  |              |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B180556  
**Matrix:** Soil/Sediment  
**Method:** SM 2540G  
**Analyte:** %TS

| Sample       | Result | Units |
|--------------|--------|-------|
| B180556-BLK1 | -0.01  | %     |
| B180556-BLK2 | -0.01  | %     |

**Average:** -0.01  
**Limit:** 0.02

**MDL:** 0.005  
**MRL:** 0.02



## Method Blanks & Reporting Limits

**Batch:** B180557  
**Matrix:** Soil/Sediment  
**Method:** EPA 150.1  
**Analyte:** pH

| Sample       | Result | Units        |
|--------------|--------|--------------|
| B180557-BLK1 | 5.21   | pH units wet |
| B180557-BLK2 | 5.88   | pH units wet |
| B180557-BLK3 | 8.88   | pH units wet |
| B180557-BLK4 | 9.46   | pH units wet |
| B180557-BLK5 | 9.78   | pH units wet |
| B180557-BLK6 | 9.79   | pH units wet |
| B180557-BLK7 | 9.80   | pH units wet |
| B180557-BLK8 | 9.81   | pH units wet |
| B180557-BLK9 | 7.69   | pH units wet |
| B180557-BLKA | 7.11   | pH units wet |
| B180557-BLKB | 7.15   | pH units wet |
| B180557-BLKC | 7.74   | pH units wet |
| B180557-BLKD | 9.80   | pH units wet |
| B180557-BLKE | 9.81   | pH units wet |
| B180557-BLKF | 9.81   | pH units wet |
| B180557-BLKG | 9.81   | pH units wet |

| Sample ID    | Synthetic GW pH Control   | Soil:Solution Ratio, Equilibration Time        | Arsenic Spikes Used in Synthetic GW |
|--------------|---|--|-------------------------------------|
| B180557-BLK1 | No Buffer in Synthetic GW   | 1:10 Solution Ratio, 72 hrs Equilibration Time | 0.4 mg/L As(III)                    |
| B180557-BLK2 |   |  | 1 mg/L As(III)                      |
| B180557-BLK3 |   |  | 5 mg/L As (III)                     |
| B180557-BLK4 |   |  | 20 mg/L As (III)                    |
| B180557-BLK5 | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(III)                    |
| B180557-BLK6 |   |  | 1 mg/L As(III)                      |
| B180557-BLK7 |   |  | 5 mg/L As (III)                     |
| B180557-BLK8 |   |  | 20 mg/L As (III)                    |
| B180557-BLK9 | No Buffer in Synthetic GW   |  | 0.4 mg/L As(V)                      |
| B180557-BLKA |   |  | 1 mg/L As(V)                        |
| B180557-BLKB |   |  | 5 mg/L As (V)                       |
| B180557-BLKC |   |  | 20 mg/L As (V)                      |
| B180557-BLKD | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW | 0.4 mg/L As(V)                                 |                                     |
| B180557-BLKE |   | 1 mg/L As(V)                                   |                                     |
| B180557-BLKF |   | 5 mg/L As (V)                                  |                                     |
| B180557-BLKG |   | 20 mg/L As (V)                                 |                                     |



## Method Blanks & Reporting Limits

**Batch:** B180558  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** As(BAT)

| Sample       | Result | Units |
|--------------|--------|-------|
| B180558-BLK1 | 378    | µg/L  |
| B180558-BLK2 | 932    | µg/L  |
| B180558-BLK3 | 4400   | µg/L  |
| B180558-BLK4 | 16800  | µg/L  |
| B180558-BLK5 | 386    | µg/L  |
| B180558-BLK6 | 947    | µg/L  |
| B180558-BLK7 | 4410   | µg/L  |
| B180558-BLK8 | 17700  | µg/L  |
| B180558-BLK9 | 406    | µg/L  |
| B180558-BLKA | 1010   | µg/L  |
| B180558-BLKB | 4920   | µg/L  |
| B180558-BLKC | 19500  | µg/L  |
| B180558-BLKD | 408    | µg/L  |
| B180558-BLKE | 1010   | µg/L  |
| B180558-BLKF | 4900   | µg/L  |
| B180558-BLKG | 19900  | µg/L  |

**MDL:** 1.00  
**MRL:** 10.0

| Sample ID    | Synthetic GW pH Control   | Soil:Solution Ratio, Equilibration Time        | Arsenic Spikes Used in Synthetic GW |
|--------------|---|--|-------------------------------------|
| B180558-BLK1 | No Buffer in Synthetic GW   | 1:10 Solution Ratio, 72 hrs Equilibration Time | 0.4 mg/L As(III)                    |
| B180558-BLK2 |   |  | 1 mg/L As(III)                      |
| B180558-BLK3 |   |  | 5 mg/L As (III)                     |
| B180558-BLK4 |   |  | 20 mg/L As (III)                    |
| B180558-BLK5 | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(III)                    |
| B180558-BLK6 |   |  | 1 mg/L As(III)                      |
| B180558-BLK7 |   |  | 5 mg/L As (III)                     |
| B180558-BLK8 |   |  | 20 mg/L As (III)                    |
| B180558-BLK9 | No Buffer in Synthetic GW   |  | 0.4 mg/L As(V)                      |
| B180558-BLKA |   |  | 1 mg/L As(V)                        |
| B180558-BLKB |   |  | 5 mg/L As (V)                       |
| B180558-BLKC |   |  | 20 mg/L As (V)                      |
| B180558-BLKD | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(V)                      |
| B180558-BLKE |   |  | 1 mg/L As(V)                        |
| B180558-BLKF |   |  | 5 mg/L As (V)                       |
| B180558-BLKG |   |  | 20 mg/L As (V)                      |



## Method Blanks & Reporting Limits

**Batch:** B180696  
**Matrix:** Soil/Sediment  
**Method:** EPA 6020B Mod  
**Analyte:** As(BAT)

| Sample       | Result | Units |
|--------------|--------|-------|
| B180696-BLK1 | 3.78   | mg/kg |
| B180696-BLK2 | 9.32   | mg/kg |
| B180696-BLK3 | 44.0   | mg/kg |
| B180696-BLK4 | 168    | mg/kg |
| B180696-BLK5 | 3.86   | mg/kg |
| B180696-BLK6 | 9.47   | mg/kg |
| B180696-BLK7 | 44.1   | mg/kg |
| B180696-BLK8 | 177    | mg/kg |
| B180696-BLK9 | 4.06   | mg/kg |
| B180696-BLKA | 10.1   | mg/kg |
| B180696-BLKB | 49.2   | mg/kg |
| B180696-BLKC | 195    | mg/kg |
| B180696-BLKD | 4.08   | mg/kg |
| B180696-BLKE | 10.1   | mg/kg |
| B180696-BLKF | 49.0   | mg/kg |
| B180696-BLKG | 199    | mg/kg |

**MDL:** 1.00  
**MRL:** 10.0

| Sample ID    | Synthetic GW pH Control   | Soil:Solution Ratio, Equilibration Time        | Arsenic Spikes Used in Synthetic GW |
|--------------|---|--|-------------------------------------|
| B180696-BLK1 | No Buffer in Synthetic GW   | 1:10 Solution Ratio, 72 hrs Equilibration Time | 0.4 mg/L As(III)                    |
| B180696-BLK2 |   |  | 1 mg/L As(III)                      |
| B180696-BLK3 |   |  | 5 mg/L As (III)                     |
| B180696-BLK4 |   |  | 20 mg/L As (III)                    |
| B180696-BLK5 | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(III)                    |
| B180696-BLK6 |   |  | 1 mg/L As(III)                      |
| B180696-BLK7 |   |  | 5 mg/L As (III)                     |
| B180696-BLK8 |   |  | 20 mg/L As (III)                    |
| B180696-BLK9 | No Buffer in Synthetic GW   |  | 0.4 mg/L As(V)                      |
| B180696-BLKA |   |  | 1 mg/L As(V)                        |
| B180696-BLKB |   |  | 5 mg/L As (V)                       |
| B180696-BLKC |   |  | 20 mg/L As (V)                      |
| B180696-BLKD | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW |  | 0.4 mg/L As(V)                      |
| B180696-BLKE |   |  | 1 mg/L As(V)                        |
| B180696-BLKF |   |  | 5 mg/L As (V)                       |
| B180696-BLKG |   |  | 20 mg/L As (V)                      |



**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-01                |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-2.0-4.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                               | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-02                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-13.0-15.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-03                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-23.0-25.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-04                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-31.0-33.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

Project ID: PTC-OA1701-4  
PM: Jeremy Maute



BAL Report 1809005 Rev 1  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-05                |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/15/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-2.5-4.5 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/15/2017  |       |    |                    |
| Des                                      | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-06                  |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/15/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-11.5-13.5 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/15/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-07                  |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/15/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-23.0-25.0 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/15/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-08                  |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/15/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-31.5-33.5 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/15/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-09                  |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/20/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-10.0-12.0 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/21/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 3 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-10                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-17.3-20.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

| <b>Lab ID:</b> 1809005-11                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-22.5-25.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

| <b>Lab ID:</b> 1809005-12                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-35.8-36.5 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-13           |                   |             | <b>Report Matrix:</b> Water-D |                     |              | <b>Collected:</b> 09/21/2017 |                    |
|-------------------------------------|-------------------|-------------|-------------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-713-2-092117-(20) |                   |             | <b>Sample Type:</b> Sample    |                     |              | <b>Received:</b> 09/21/2017  |                    |
| <b>Des</b>                          | <b>Container</b>  | <b>Size</b> | <b>Lot</b>                    | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| B                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| C                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| D                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| E                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| F                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| G                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| H                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| I                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| J                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |

| <b>Lab ID:</b> 1809005-14                    |                  |             | <b>Report Matrix:</b> Soil |                     |              | <b>Collected:</b> 10/03/2017 |                    |
|--|------------------|-------------|----------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> SO-122+60-0-SED-100317-0-0.33 |                  |             | <b>Sample Type:</b> Sample |                     |              | <b>Received:</b> 10/03/2017  |                    |
| <b>Des</b>                                   | <b>Container</b> | <b>Size</b> | <b>Lot</b>                 | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz         | 17-0058                    | None                | n/a          |                              | Cooler 6 - 1809005 |
| B  | EXTRA_VOL        | 8oz         | 17-0058                    | None                | n/a          |                              | Cooler 6 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-15                    |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/03/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-125+50-0-SED-100317-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/03/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 6 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 6 - 1809005 |

| <b>Lab ID:</b> 1809005-16                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-120+75-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |

| <b>Lab ID:</b> 1809005-17                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-125+00-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |

| <b>Lab ID:</b> 1809005-18                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-128+50-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-19      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 0.4 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-20      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 1 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-21      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 5 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-22      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 20 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-23      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-24      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
1 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-25      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
5 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-26      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
20 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-27      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 0.4 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-28      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 1 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-29      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 5 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-30      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 20 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-31      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-32      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
1 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-33      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
5 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-34      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
20 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Shipping Containers

### Cooler 2 - 1809005

Received: September 15, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: -11.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? Yes  
Custody seals intact? Yes  
COC present? Yes

### Cooler 3 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: -19.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 4 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Ice  
Temperature: 15.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #10

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 5 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Ice  
Temperature: 14.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #10

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 6 - 1809005

Received: October 3, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 1.0 °C

Description: Cooler 6  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 7 - 1809005

Received: September 15, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 2.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 7 - 1809005

Received: October 6, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 2.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Rev 1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### **Cooler 8 - 1809005**

**Received:** September 13, 2017 14:00  
**Tracking No:** n/a via Courier  
**Coolant Type:** Blue ice  
**Temperature:** 12.0 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR #8

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466 / *LUKE KERNER*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Susan [Signature]* For BAL use only Date: 9/13/17

Work Order ID: \_\_\_\_\_ Time: 1400

Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_  
 Port of Tacoma Troy Bussey (PIONEER)  
 PO Box 1537 5205 Corporate Center, Cl. St. Ste A  
 Tacoma, WA 98401 1807 Olympia, WA 98503

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)   | Collection                   |                      | Client Sample Info |                                 |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|------------------------------|----------------------|--------------------|---------------------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                         | Time                 | Matrix Type        | Number of Containers            | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID                    |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 1   | SO-PTC-002-091317-2.0-4.0    | 9/13/17 8:30         | SOIL               | 1                               |                 |                   |  |   | X   |   |   |   |  |          | Specify Here                         |
| 2   | SO-PTC-002-091317-13.0-15.0  | 9/13/17 8:40         | SOIL               | 1                               |                 |                   |  |   | X   |   |   |   |  |          |                                      |
| 3   | SO-PTC-002-091317-23.0-25.0  | 9/13/17 8:50         | SOIL               | 1                               |                 |                   |  |   | X   |   |   |   |  |          |                                      |
| 4   | SO-PTC-002-091317-31.0-33.0  | 9/13/17 9:20         | SOIL               | 1                               |                 |                   |  |   | X   |   |   |   |  |          |                                      |
| <del>5</del>  | <del>SO-PTC-208-091317</del> |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| <del>6</del>  | <del>SO-PTC-205-091317</del> |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 7   |                              |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 8   |                              |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 9   |                              |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 10  |                              |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | Trip Blank (specify)         |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <i>Luke Kerner</i>   |                              | Date: <u>9/13/17</u> | Time: <u>1300</u>  | Relinquished By: _____          |                 |                   |  | Date: _____   | Time: _____   |   |   |   |  |          |                                      |
| Received By: <i>[Signature]</i>   |                              | Date: <u>9/13/17</u> | Time: <u>1303</u>  | Total Number of Packages: _____ |                 |                   |  |   |   |   |   |   |  |          |                                      |

**Print**



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466 / *dgcooper*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

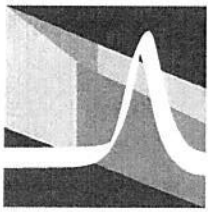
Received by: *Lauren Miller* For BAL use only Date: 9/15/17  
 Work Order ID: \_\_\_\_\_ Time: 1630  
 Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_  
18804 North Creek Parkway, Suite 100, Bothell, WA 98011-3127  
 Troy Bussey (PIONEER)  
 360-570-1700  
 troy@uspioneer.com

Email Receipt Confirmation? Yes  
 BAL PM: **Jeremy Maute**

| Requested TAT (business days)  | Collection                              |             | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|-------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time        | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |             |                    |                      |                 |                           |  |   |   |   |   |   |  |          | Specify Here                         |
| 1  | JO-PTC-101-091417-8.2-10.2              | 9/14/17     | 1350               | SOIL                 | 1               |                           |  | X   | X   |   |   |   |  |          |                                      |
| 2  | JO-PTC-101-091417-19.3-20.3             | 9/14/17     | 1405               | SOIL                 | 1               |                           |  | X   | X   |   |   |   |  |          |                                      |
| 3  | JO-PTC-001-091517-2.5-4.5               | 9/15/17     | 11:50              | SOIL                 | 1               |                           |  |   |   | X   |   |   |  |          |                                      |
| 4  | JO-PTC-001-091517-11.5-13.5             | 9/15/17     | 12:00              | SOIL                 | 1               |                           |  |   |   | X   |   |   |  |          |                                      |
| 5  | JO-PTC-001-091517-23.0-25.0             | 9/15/17     | 12:20              | SOIL                 | 1               |                           |  |   |   | X   |   |   |  |          |                                      |
| 6  | JO-PTC-001-091517-31.5-33.5             | 9/15/17     | 11:20              | SOIL                 | 1               |                           |  |   |   | X   |   |   |  |          |                                      |
| 7  |   |             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 8  |   |             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 9  |   |             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 10   |   |             |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   | 9/15/17     |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <i>Lauren Miller</i>  | Date: <del>9/14/17</del>                | Time: 12:35 | Relinquished By:   | Date:                | Time:           | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |
| Received By: <i>Armando Amato</i>  | Date: 9.15.17                           | Time: 12:35 |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |





**BROOKS  
APPLIED  
LABS**

# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466 / *L. Kerner*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Lawson* For BAL Use Only Date: *9/21/17*  
 Work Order ID: \_\_\_\_\_ Time: *9:10*  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |              | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |  |
|--|---|--------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|--|
|  | Date                                    | Time         | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |  |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |
| Sample ID  |   |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          | Specify Here                         |  |
| 1  | SO-PTC-129-092017-10.0-12.0             | 9/20/17 1315 | SOIL                      | 1                    |                 |                   | X  | X   | X   |   |   |   |  |          |                                      |  |
| 2  | SO-PTC-129-092017-17.3-20.0             | 9/20/17 1320 | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |          |                                      |  |
| 3  | SO-PTC-129-092017-22.5-25.0             | 9/20/17 1325 | SOIL                      | 1                    |                 |                   | X  | X   | X   |   |   |   |  |          |                                      |  |
| 4  | SO-PTC-129-092017-35.8-36.5             | 9/20/17 1500 | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |          |                                      |  |
| 5  |   |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |
| 6  |   |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |
| 7  |   |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |
| 8  |   |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |
| 9  |   |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |
| 10   |   |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |
| Trip Blank (specify)   |   |              |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |
| Relinquished By: <i>[Signature]</i>  | Date: 9/21/17                           | Time: 9:10   | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |  |          |                                      |  |
| Received By: <i>[Signature]</i>  | Date: 9/21/17                           | Time: 9:10   | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |  |

Page \_\_\_\_ of \_\_\_\_ List Hazardous Contaminants: \_\_\_\_\_

samples@brooksupplied.com | brooksupplied.com

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# Chain-of-Custody Form

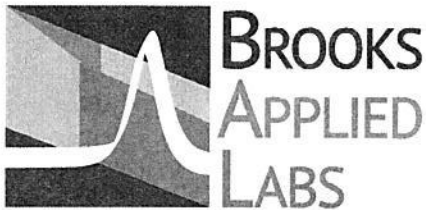
Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Received by: Jo Walk For BAL use only Date: 9/21/17  
Work Order ID: \_\_\_\_\_ Time: 14:11  
Project ID: \_\_\_\_\_

Client: Pioneer Technologies PO Number: 79227 Mailing Address: \_\_\_\_\_  
Contact: Troy Bursey (burseyt@uspioneer.com) Phone: 360-570-1700  
Client Project ID: Arkema FSDG Inv Email: Burseyt@uspioneer.com Email Receipt Confirmation? (Yes/No) \_\_\_\_\_  
Samples Collected By: L. Hank 2083167223 BAL PM: \_\_\_\_\_

| Requested TAT<br>(business days)<br><br><input type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Collection                  |                | Client Sample Info |                      |                             |   | BAL Analyses Required |                     |                            |   |   |            |   | Comments        |  |
|---|-----------------------------|----------------|--------------------|----------------------|-----------------------------|---|-----------------------|---------------------|----------------------------|---|---|------------|---|-----------------|--|
|   | Date                        | Time           | Matrix Type        | Number of Containers | Field Filtered?<br>(Yes/No) | Preservation Type<br>HCl /HNO <sub>3</sub> /Other | Total Hg, EPA 1631    | Methyl Hg, EPA 1630 | ICP-MS Metals<br>(specify) | As Species (specify)<br>InOrg, III, V, MMA, DMA | Se Species (specify)<br>Se(IV), Se(VI), SeCN, Unknown | Filtration | Other (specify)<br>Unimpacted Groundwater for Batch<br>Absorption Tests | Other (specify) | Specify Here   |
| Sample ID   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 1   | <u>GW-713-2-092117-(20)</u> | <u>9/21/17</u> | <u>1145</u>        | <u>WATER</u>         | <u>9-22<br/>-16</u>         | <u>Yes</u>  |                       |                     |                            |   |   |            | <input checked="" type="checkbox"/>                                     |                 | <u>Unimpacted Groundwater for Batch Absorption Tests</u> |
| 2   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 3   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 4   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 5   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 6   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 7   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 8   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 9   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 10  |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| Trip Blank  |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |

Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Total Number of Packages: 2



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Lawson For BAL use only Date: 10/3/17  
 Work Order ID: 1737058 Time: 1310  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |                      | Client Sample Info |                      |                 |                                 | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |           |
|--|---|----------------------|--------------------|----------------------|-----------------|---------------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|-----------|
|  | Date                                    | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type               | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |           |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID                               |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
| 1  | <del>SD-122+60-D-5ED-100317-0-033</del> |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      | <i>LK</i> |
| 2  | SD-122+60-D-5ED-100317-0-033            | 10/3/17              | 10:20              | Soil                 | 1               | No                              |  |   | X   |   |   |   |  |          |                                      |           |
| 3  | SD-125+50-D-5ED-100317-0-033            | 10/3/17              | 920                | Soil                 | 1               | No                              |  |   | X   |   |   |   |  |          |                                      |           |
| 4  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
| 5  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
| 6  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
| 7  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
| 8  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
| 9  |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
| 10   |   |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
|  | Trip Blank (specify)                    |                      |                    |                      |                 |                                 |  |   |   |   |   |   |  |          |                                      |           |
| Relinquished By: <u>Lawson</u>   |   | Date: <u>10/3/17</u> |                    | Time: <u>1310</u>    |                 | Relinquished By: _____          |  |   |   |   | Date: _____   |   | Time: _____  |          |                                      |           |
| Received By: _____   |   | Date: _____          |                    | Time: _____          |                 | Total Number of Packages: _____ |  |   |   |   |   |   |  |          |                                      |           |

Print





# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

For BAL use only  
 Received by: Jeremy Maute Date: 10/6/17  
 Work Order ID: \_\_\_\_\_ Time: 12:30  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837

Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct. SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |                      | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|----------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          | Specify Here                         |
| 1  | SD-120+75-ST1-SED-100417-0-0.33         | 10/4/17              | 1330               | SOIL                 | 1               |                           |  |   |   | X   |   |   |  |          |                                      |
| 2  | SD-175+00-ST1-SED-100417-1-0.33         | ↓                    | 1430               | SOIL                 | 1               |                           |  |   |   | X   |   |   |  |          |                                      |
| 3  | SD-128+50-ST1-SED-100417-0-0.33         | ↓                    | 1530               | SOIL                 | 1               |                           |  |   |   | X   |   |   |  |          |                                      |
| 4  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 5  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 6  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 7  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 8  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 9  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 10   |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Maute</u>  |   | Date: <u>10/6/17</u> |                    | Time:                |                 | Relinquished By:          |  |   |   | Date:   |   | Time:   |  |          |                                      |
| Received By:   |   | Date:                |                    | Time:                |                 | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |

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18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

April 30, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701-4

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On September 13<sup>th</sup> through October 3<sup>rd</sup>, 2017, Brooks Applied Labs (BAL) received seventeen (17) soil/sediment samples.

Shortly after receipt, all submitted core samples were unpacked in a glove box maintained under anoxic conditions, split into appropriate sample containers, and then stored according to BAL SOPs. All sample fractions designated for batch adsorption testing (BAT) were frozen pending the client's decision on which samples to analyze. The client notified BAL that the client samples SO-PTC-001-091517-23.0-25.0, SO-PTC-002-091317-23.0-25.0, SO-PTC-001-091517-2.5-4.5, and SO-PTC-001-091517-11.5-13.5 should undergo Batch Adsorption Testing (BAT), in accordance with the procedure submitted by the client titled **Design for Arkema BAT Round 4\_032818**. This report only contains the BAT results for the client samples SO-PTC-001-091517-23.0-25.0, SO-PTC-002-091317-23.0-25.0, SO-PTC-001-091517-2.5-4.5, and SO-PTC-001-091517-11.5-13.5 processed according to the document **Design for Arkema BAT Round 4\_032818**.

All samples were stored and prepped anoxically in an oxygen free glove box. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

#### Batch Adsorption Testing (BAT)

Prior to the BAT, the soil samples were dried in a glove box maintained under anoxic conditions and then sieved using a 2mm mesh size. An aliquot of each sieved sample was then taken for dry weight determination; in accordance with the BAT protocol, the resulting dry weights were used to calculate the appropriate sample masses required for the testing. All subsequent testing was performed on the original sieved sample portions.

In accordance with client instructions, eight (8) separate synthetic groundwater solutions were prepared for the BAT. Reagent solutions were degassed with an N<sub>2</sub> purge prior to use. All solutions were initially prepared as NaCl solutions with a total dissolved solids (TDS) = 4030 mg/L. A carbonate buffer was added to half of the solutions. The resulting solutions were spiked with As(III) and As(V) spikes according to the following table.

**Spiked GW Solutions**

| Sample ID  | Sample ID | Synthetic GW pH Control  | Soil:Solution Ratio, Equilibration Time         | Arsenic Spikes Used in Synthetic GW |
|------------|-----------|--|---|-------------------------------------|
| BLK1/BLK9  | BS1/BS9   | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub> Buffer Used in Synthetic GW | 1:10 Solution Ratio, 72 hrs. Equilibration Time | 20 mg/L As (III)                    |
| BLK2       | BS2       |  |   | 0.4 mg/L As(III)                    |
| BLK3       | BS3       |  |   | 1 mg/L As(III)                      |
| BLK4       | BS4       |  |   | 5 mg/L As (III)                     |
| BLK5       | BS5       |  |   | 0.4 mg/L As(V)                      |
| BLK6       | BS6       |  |   | 1 mg/L As(V)                        |
| BLK7/ BLKA | BS7/BSA   |  |   | 5 mg/L As (V)                       |
| BLK8/ BLKB | BS8/BSB   |  |   | 20 mg/L As (V)                      |

\*Method Blank Sample = Spiked Synthetic GW (method blank sample subjected to tumbling step - same as client samples).

\*\* Blank Spike Sample = Spiked Synthetic GW (not subjected to tumbling step).

An aliquot of each spiked synthetic groundwater solution was split into a separate container, acidified to a pH < 2 with nitric acid, and then analyzed for determination of the initial arsenic concentration. These fractions are identified as blank spike samples in the attached *Accuracy and Precision* tables.

Aliquots of the spiked synthetic groundwater were also added to empty sample containers and tumbled alongside the client samples to monitor for potential losses during the extraction procedure. These fractions are identified as method blank samples in the attached *Accuracy and Precision* tables.

Aliquots of the remaining spiked synthetic groundwater were added to an appropriate mass of each sample to achieve the requested soil: solution ratio of 1:10. For each client sample, a matrix duplicate sample has been prepped with the client samples. The following table describes the source sample each Matrix QC sample is associated with.

**M/MD Sample ID Cross Reference Table**

| Sample ID  | Associated Matrix QC Sample | Synthetic GW pH Control   | Soil:Solution Ratio, Equilibration Time         | Arsenic Spikes Used in Synthetic GW |
|------------|-----------------------------|---|---|-------------------------------------|
| 1809005-35 | B180807-DUP1                | 0.01 M Na <sub>2</sub> CO <sub>3</sub> /<br>0.01 M NaHCO <sub>3</sub><br>Buffer<br>Used in Synthetic GW | 1:10 Solution Ratio, 72 hrs. Equilibration Time | 20 mg/L As (III)                    |
| 1809005-36 | B180807-DUP2                |   |   | 0.4 mg/L As(III)                    |
| 1809005-37 | B180807-DUP3                |   |   | 1 mg/L As(III)                      |
| 1809005-38 | B180807-DUP4                |   |   | 5 mg/L As (III)                     |
| 1809005-39 | B180807-DUP5                |   |   | 20 mg/L As (III)                    |
| 1809005-40 | B180807-DUP6                |   |   | 0.4 mg/L As(III)                    |
| 1809005-41 | B180807-DUP7                |   |   | 1 mg/L As(III)                      |
| 1809005-42 | B180807-DUP8                |   |   | 5 mg/L As (III)                     |
| 1809005-43 | B180807-DUP9                |   |   | 20 mg/L As (III)                    |
| 1809005-44 | B180807-DUPA                |   |   | 0.4 mg/L As(V)                      |
| 1809005-45 | B180807-DUPB                |   |   | 1 mg/L As(V)                        |
| 1809005-46 | B180807-DUPC                |   |   | 5 mg/L As (V)                       |
| 1809005-47 | B180807-DUPD                |   |   | 20 mg/L As (V)                      |
| 1809005-48 | B180807-DUPE                |   |   | 0.4 mg/L As(III)                    |
| 1809005-49 | B180807-DUPF                |   |   | 1 mg/L As(III)                      |
| 1809005-50 | B180807-DUPG                |   |   | 5 mg/L As (III)                     |
| 1809005-51 | B180807-DUPH                |   |   | 20 mg/L As (III)                    |
| 1809005-52 | B180807-DUPI                |   |   | 0.4 mg/L As(V)                      |
| 1809005-53 | B180807-DUPJ                |   |   | 1 mg/L As(V)                        |
| 1809005-54 | B180807-DUPK                |   |   | 5 mg/L As (V)                       |
| 1809005-55 | B180807-DUPL                | 20 mg/L As (V)  |   |                                     |

All prepared samples were then placed on a rotary tumbler (kept inside the glove box) and allowed to tumble for 72 hours. After the designed equilibration time had elapsed an aliquot of each resulting extract was filtered (0.45µm), acidified to a pH < 2 with nitric acid, and then reserved for dissolved As analysis. The remaining extract for each sample was evaluated for pH and temperature.

#### pH and Temperature Measurements

The pH of all extracts was measured via a modified SM2540B using a calibrated pH electrode.

The measured values for pH and temperature are included in the results section of the report.

#### Total Metals Quantitation of the BAT Extracts

An aliquot of each extract was directly analyzed for As using inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website.

A matrix duplicate (MD) was performed for each designated spiked synthetic groundwater. Due to the nature of the BAT, no matrix spikes could be performed during the extraction procedure. Instead, analytical spikes (designated as B18xxx-PSx) were prepared at the time of analysis to demonstrate the accuracy of the analyses.

The results are reported using a BAT (Solids) basis, where the masses and volumes used in the batch absorption tumbling step are factored into the final results (Batch B180959). The results are also reported by BAT (Aqueous) basis, where the final results are reported using the values obtained by direct analysis of the filtered aqueous fractions from the batch absorption test (Batch B180960).

Arsenic recoveries for all method blanks and blank spike samples were within acceptable ranges.

Several continuous calibration blank (CCB) samples yielded arsenic results greater than the associated MRLs. In all cases the bracketed samples were greater than 10x the elevated CCB result; the elevated CCBs should have minimal impact on data quality. Consequently, no qualification of data is required.

The arsenic relative percent difference (RPD) values for the laboratory duplicate samples, B180960-DUPE and B180960-DUPG, were greater than the control limit of 20%, at 35% and 22%, respectively. Re-analyses confirmed the RPD outliers. Results from the initial analyses are reported. The arsenic results for the source samples, 1809005-48 and 1809005-50, should be considered estimated due to poor precision, and has been qualified "M".

The results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where a post spike sample was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

With the exceptions noted above, all data was reported without qualification and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'J Maute', with a stylized flourish extending to the right.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Please see narrative for explanation.                                      |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.                               |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Please see narrative for explanation.  |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---|------------|---------------|--------|------------|------------|
| SO-PTC-002-091317-2.0-4.0                               | 1809005-01 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-13.0-15.0                             | 1809005-02 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0                             | 1809005-03 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-31.0-33.0                             | 1809005-04 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-001-091517-2.5-4.5                               | 1809005-05 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5                             | 1809005-06 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0                             | 1809005-07 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-31.5-33.5                             | 1809005-08 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-129-092017-10.0-12.0                             | 1809005-09 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-17.3-20.0                             | 1809005-10 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-22.5-25.0                             | 1809005-11 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-35.8-36.5                             | 1809005-12 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| GW-713-2-092117-(20)                                    | 1809005-13 | Water-D       | Sample | 09/21/2017 | 09/21/2017 |
| SO-122+60-0-SED-100317-0-0.33                           | 1809005-14 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-125+50-0-SED-100317-0-0.33                           | 1809005-15 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-120+75-ST1-SED-100417-0-0.33                         | 1809005-16 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33                         | 1809005-17 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-128+50-ST1-SED-100417-0-0.33                         | 1809005-18 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 0.4 mg/L As(III)   | 1809005-19 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 1 mg/L As(III)     | 1809005-20 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 5 mg/L As(III)     | 1809005-21 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 20 mg/L As(III)    | 1809005-22 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 0.4 mg/L As(III) | 1809005-23 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 1 mg/L As(III)   | 1809005-24 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 5 mg/L As(III)   | 1809005-25 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 20 mg/L As(III)  | 1809005-26 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 0.4 mg/L As(V)     | 1809005-27 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 1 mg/L As(V)       | 1809005-28 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 5 mg/L As(V)       | 1809005-29 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 20 mg/L As(V)      | 1809005-30 | Soil          | Sample | 09/15/2017 | 09/15/2017 |





## Sample Information

| Sample  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---|------------|---------------|--------|------------|------------|
| SO-PTC-001-091517-23.0-25.0_With Buff, 0.4 mg/L As(V)   | 1809005-31 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 1 mg/L As(V)     | 1809005-32 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 5 mg/L As(V)     | 1809005-33 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 20 mg/L As(V)    | 1809005-34 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 20 mg/L As(III)  | 1809005-35 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-002-091317-23.0-25.0_With Buff, 0.4 mg/L As(III) | 1809005-36 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0_With Buff, 1 mg/L As(III)   | 1809005-37 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0_With Buff, 5 mg/L As(III)   | 1809005-38 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0_With Buff, 20 mg/L As(III)  | 1809005-39 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 0.4 mg/L As(III)   | 1809005-40 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 1 mg/L As(III)     | 1809005-41 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 5 mg/L As(III)     | 1809005-42 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 20 mg/L As(III)    | 1809005-43 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 0.4 mg/L As(V)     | 1809005-44 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 1 mg/L As(V)       | 1809005-45 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 5 mg/L As(V)       | 1809005-46 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 20 mg/L As(V)      | 1809005-47 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 0.4 mg/L As(III) | 1809005-48 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 1 mg/L As(III)   | 1809005-49 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 5 mg/L As(III)   | 1809005-50 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 20 mg/L As(III)  | 1809005-51 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 0.4 mg/L As(V)   | 1809005-52 | Soil          | Sample | 09/15/2017 | 09/15/2017 |



## Sample Information

| Sample  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---|------------|---------------|--------|------------|------------|
| SO-PTC-001-091517-11.5-13.5_With Buff, 1 mg/L As(V)       | 1809005-53 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 5 mg/L As(V)       | 1809005-54 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 20 mg/L As(V)      | 1809005-55 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 0.4 mg/L As(III)   | 1809005-56 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 1 mg/L As(III)     | 1809005-57 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 5 mg/L As(III)     | 1809005-58 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 20 mg/L As(III)    | 1809005-59 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 0.4 mg/L As(V)     | 1809005-60 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 1 mg/L As(V)       | 1809005-61 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 5 mg/L As(V)       | 1809005-62 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 20 mg/L As(V)      | 1809005-63 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 0.4 mg/L As(III) | 1809005-64 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 1 mg/L As(III)   | 1809005-65 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 5 mg/L As(III)   | 1809005-66 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 20 mg/L As(III)  | 1809005-67 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 0.4 mg/L As(V)   | 1809005-68 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 1 mg/L As(V)     | 1809005-69 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 5 mg/L As(V)     | 1809005-70 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 20 mg/L As(V)    | 1809005-71 | Soil          | Sample | 10/04/2017 | 10/06/2017 |



## Batch Summary

| Analyte | Lab Matrix    | Method        | Prepared   | Analyzed   | Batch   | Sequence |
|---------|---------------|---------------|------------|------------|---------|----------|
| %TS     | Soil/Sediment | SM 2540G      | 10/03/2017 | 10/09/2017 | B172830 | N/A      |
| %TS     | Soil/Sediment | SM 2540G      | 03/12/2018 | 04/03/2018 | B180556 | N/A      |
| %TS     | Soil/Sediment | SM 2540G      | 03/30/2018 | 04/03/2018 | B180805 | N/A      |
| As(BAT) | Soil/Sediment | EPA 6020B Mod | 04/04/2018 | 04/18/2018 | B180959 | 1800522  |
| As(BAT) | Water         | EPA 1638 Mod  | 04/04/2018 | 04/18/2018 | B180960 | 1800522  |
| pH      | Soil/Sediment | EPA 150.1     | 04/04/2018 | 04/09/2018 | B180807 | N/A      |

BAT = Batch Absorption Testing

B180960: BAT results in terms of ug/L (*i.e.. direct analysis of BAT fractions*).

B180959: BAT Results in terms of mg/kg-dry (*i.e.. mass, final volumes, and %TS used to calculate results*).]



## Sample Results

| Sample  | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit         | Batch   | Sequence |
|---|---------|---------------|-------|--------|-----------|-------|-------|--------------|---------|----------|
| <b>SO-PTC-001-091517-23.0-25.0_ With Buff, 20 mg/L As(III)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-35  | %TS     | Soil          | NA    | 99.49  |           | 0.01  | 0.04  | %            | B180556 | N/A      |
| 1809005-35  | As(BAT) | Soil          | dry   | 178    |           | 0.020 | 0.200 | mg/kg        | B180959 | 1800522  |
| 1809005-35  | As(BAT) | Soil          | dry   | 17800  |           | 2.00  | 20.0  | µg/L         | B180960 | 1800522  |
| 1809005-35  | pH      | Soil          | dry   | 9.57   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-002-091317-23.0-25.0_ With Buff, 0.4 mg/L As(III)</b> |         |               |       |        |           |       |       |              |         |          |
| 1809005-36  | %TS     | Soil          | NA    | 99.67  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-36  | As(BAT) | Soil          | dry   | 3.33   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-36  | As(BAT) | Soil          | dry   | 336    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-36  | pH      | Soil          | dry   | 9.62   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-002-091317-23.0-25.0_ With Buff, 1 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-37  | %TS     | Soil          | NA    | 99.67  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-37  | As(BAT) | Soil          | dry   | 8.44   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-37  | As(BAT) | Soil          | dry   | 850    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-37  | pH      | Soil          | dry   | 9.65   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-002-091317-23.0-25.0_ With Buff, 5 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-38  | %TS     | Soil          | NA    | 99.67  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-38  | As(BAT) | Soil          | dry   | 44.6   |           | 0.008 | 0.080 | mg/kg        | B180959 | 1800522  |
| 1809005-38  | As(BAT) | Soil          | dry   | 4470   |           | 0.800 | 8.00  | µg/L         | B180960 | 1800522  |
| 1809005-38  | pH      | Soil          | dry   | 9.67   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-002-091317-23.0-25.0_ With Buff, 20 mg/L As(III)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-39  | %TS     | Soil          | NA    | 99.67  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-39  | As(BAT) | Soil          | dry   | 175    |           | 0.020 | 0.199 | mg/kg        | B180959 | 1800522  |
| 1809005-39  | As(BAT) | Soil          | dry   | 17600  |           | 2.00  | 20.0  | µg/L         | B180960 | 1800522  |
| 1809005-39  | pH      | Soil          | dry   | 9.65   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-2.5-4.5_ With Buff, 0.4 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-40  | %TS     | Soil          | NA    | 98.62  |           | 0.01  | 0.04  | %            | B172830 | N/A      |
| 1809005-40  | As(BAT) | Soil          | dry   | 1.58   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-40  | As(BAT) | Soil          | dry   | 159    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-40  | pH      | Soil          | dry   | 9.11   |           |       |       | pH units dry | B180807 | N/A      |



## Sample Results

| Sample   | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit         | Batch   | Sequence |
|--|---------|---------------|-------|--------|-----------|-------|-------|--------------|---------|----------|
| <b>SO-PTC-001-091517-2.5-4.5_ With Buff, 1 mg/L As(III)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-41   | %TS     | Soil          | NA    | 98.62  |           | 0.01  | 0.04  | %            | B172830 | N/A      |
| 1809005-41   | As(BAT) | Soil          | dry   | 3.51   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-41   | As(BAT) | Soil          | dry   | 351    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-41   | pH      | Soil          | dry   | 9.08   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-2.5-4.5_ With Buff, 5 mg/L As(III)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-42   | %TS     | Soil          | NA    | 98.62  |           | 0.01  | 0.04  | %            | B172830 | N/A      |
| 1809005-42   | As(BAT) | Soil          | dry   | 15.3   |           | 0.008 | 0.079 | mg/kg        | B180959 | 1800522  |
| 1809005-42   | As(BAT) | Soil          | dry   | 1550   |           | 0.800 | 8.00  | µg/L         | B180960 | 1800522  |
| 1809005-42   | pH      | Soil          | dry   | 9.02   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-2.5-4.5_ With Buff, 20 mg/L As(III)</b> |         |               |       |        |           |       |       |              |         |          |
| 1809005-43   | %TS     | Soil          | NA    | 98.62  |           | 0.01  | 0.04  | %            | B172830 | N/A      |
| 1809005-43   | As(BAT) | Soil          | dry   | 80.4   |           | 0.020 | 0.200 | mg/kg        | B180959 | 1800522  |
| 1809005-43   | As(BAT) | Soil          | dry   | 8030   |           | 2.00  | 20.0  | µg/L         | B180960 | 1800522  |
| 1809005-43   | pH      | Soil          | dry   | 9.10   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-2.5-4.5_ With Buff, 0.4 mg/L As(V)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-44   | %TS     | Soil          | NA    | 98.62  |           | 0.01  | 0.04  | %            | B172830 | N/A      |
| 1809005-44   | As(BAT) | Soil          | dry   | 1.98   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-44   | As(BAT) | Soil          | dry   | 199    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-44   | pH      | Soil          | dry   | 9.07   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-2.5-4.5_ With Buff, 1 mg/L As(V)</b>    |         |               |       |        |           |       |       |              |         |          |
| 1809005-45   | %TS     | Soil          | NA    | 98.62  |           | 0.01  | 0.04  | %            | B172830 | N/A      |
| 1809005-45   | As(BAT) | Soil          | dry   | 5.05   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-45   | As(BAT) | Soil          | dry   | 503    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-45   | pH      | Soil          | dry   | 9.05   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-2.5-4.5_ With Buff, 5 mg/L As(V)</b>    |         |               |       |        |           |       |       |              |         |          |
| 1809005-46   | %TS     | Soil          | NA    | 98.62  |           | 0.01  | 0.04  | %            | B172830 | N/A      |
| 1809005-46   | As(BAT) | Soil          | dry   | 28.6   |           | 0.008 | 0.079 | mg/kg        | B180959 | 1800522  |
| 1809005-46   | As(BAT) | Soil          | dry   | 2880   |           | 0.800 | 8.00  | µg/L         | B180960 | 1800522  |
| 1809005-46   | pH      | Soil          | dry   | 9.08   |           |       |       | pH units dry | B180807 | N/A      |



## Sample Results

| Sample  | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit         | Batch   | Sequence |
|---|---------|---------------|-------|--------|-----------|-------|-------|--------------|---------|----------|
| <b>SO-PTC-001-091517-2.5-4.5_ With Buff, 20 mg/L As(V)</b>      |         |               |       |        |           |       |       |              |         |          |
| 1809005-47  | %TS     | Soil          | NA    | 98.62  |           | 0.01  | 0.04  | %            | B172830 | N/A      |
| 1809005-47  | As(BAT) | Soil          | dry   | 144    |           | 0.020 | 0.201 | mg/kg        | B180959 | 1800522  |
| 1809005-47  | As(BAT) | Soil          | dry   | 14300  |           | 2.00  | 20.0  | µg/L         | B180960 | 1800522  |
| 1809005-47  | pH      | Soil          | dry   | 9.06   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-11.5-13.5_ With Buff, 0.4 mg/L As(III)</b> |         |               |       |        |           |       |       |              |         |          |
| 1809005-48  | %TS     | Soil          | NA    | 95.14  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-48  | As(BAT) | Soil          | dry   | 1.83   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-48  | As(BAT) | Soil          | dry   | 184    | M         | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-48  | pH      | Soil          | dry   | 9.05   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-11.5-13.5_ With Buff, 1 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-49  | %TS     | Soil          | NA    | 95.14  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-49  | As(BAT) | Soil          | dry   | 6.25   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-49  | As(BAT) | Soil          | dry   | 634    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-49  | pH      | Soil          | dry   | 9.04   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-11.5-13.5_ With Buff, 5 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-50  | %TS     | Soil          | NA    | 95.14  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-50  | As(BAT) | Soil          | dry   | 25.4   |           | 0.008 | 0.080 | mg/kg        | B180959 | 1800522  |
| 1809005-50  | As(BAT) | Soil          | dry   | 2530   | M         | 0.800 | 8.00  | µg/L         | B180960 | 1800522  |
| 1809005-50  | pH      | Soil          | dry   | 9.03   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-11.5-13.5_ With Buff, 20 mg/L As(III)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-51  | %TS     | Soil          | NA    | 95.14  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-51  | As(BAT) | Soil          | dry   | 128    |           | 0.020 | 0.199 | mg/kg        | B180959 | 1800522  |
| 1809005-51  | As(BAT) | Soil          | dry   | 12800  |           | 2.00  | 20.0  | µg/L         | B180960 | 1800522  |
| 1809005-51  | pH      | Soil          | dry   | 9.03   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-11.5-13.5_ With Buff, 0.4 mg/L As(V)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-52  | %TS     | Soil          | NA    | 95.14  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-52  | As(BAT) | Soil          | dry   | 2.62   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-52  | As(BAT) | Soil          | dry   | 263    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-52  | pH      | Soil          | dry   | 9.03   |           |       |       | pH units dry | B180807 | N/A      |





## Sample Results

| Sample   | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit         | Batch   | Sequence |
|--|---------|---------------|-------|--------|-----------|-------|-------|--------------|---------|----------|
| <b>SO-PTC-001-091517-11.5-13.5_ With Buff, 1 mg/L As(V)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-53   | %TS     | Soil          | NA    | 95.14  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-53   | As(BAT) | Soil          | dry   | 6.47   |           | 0.001 | 0.010 | mg/kg        | B180959 | 1800522  |
| 1809005-53   | As(BAT) | Soil          | dry   | 648    |           | 0.100 | 1.00  | µg/L         | B180960 | 1800522  |
| 1809005-53   | pH      | Soil          | dry   | 9.06   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-11.5-13.5_ With Buff, 5 mg/L As(V)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-54   | %TS     | Soil          | NA    | 95.14  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-54   | As(BAT) | Soil          | dry   | 29.0   |           | 0.008 | 0.079 | mg/kg        | B180959 | 1800522  |
| 1809005-54   | As(BAT) | Soil          | dry   | 2930   |           | 0.800 | 8.00  | µg/L         | B180960 | 1800522  |
| 1809005-54   | pH      | Soil          | dry   | 8.81   |           |       |       | pH units dry | B180807 | N/A      |
| <b>SO-PTC-001-091517-11.5-13.5_ With Buff, 20 mg/L As(V)</b> |         |               |       |        |           |       |       |              |         |          |
| 1809005-55   | %TS     | Soil          | NA    | 95.14  |           | 0.01  | 0.04  | %            | B180805 | N/A      |
| 1809005-55   | As(BAT) | Soil          | dry   | 147    |           | 0.020 | 0.199 | mg/kg        | B180959 | 1800522  |
| 1809005-55   | As(BAT) | Soil          | dry   | 14800  |           | 2.00  | 20.0  | µg/L         | B180960 | 1800522  |
| 1809005-55   | pH      | Soil          | dry   | 9.03   |           |       |       | pH units dry | B180807 | N/A      |



## Sample Results

| pH Measurements Summary |      |           |           |      |           | Batch: B180807   |   |                                     |
|-------------------------|------|-----------|-----------|------|-----------|--|---|-------------------------------------|
| Sample ID               | pH   | Temp (°C) | Sample ID | pH   | Temp (°C) | Synthetic GW pH Control  | Soil:Solution Ratio, Equilibration Time           | Arsenic Spikes Used in Synthetic GW |
| BLK1/BLK9               | 9.75 | 20.8      | BS1/BS9   | 9.69 | 21.5      | 0.01 M Na <sub>2</sub> CO <sub>3</sub> /<br>0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW | 1:10 Solution Ratio,<br>72 hrs Equilibration Time | 20 mg/L As (III)                    |
| BLK2                    | 9.79 | 21.0      | BS2       | 9.73 | 21.6      |  |   | 0.4 mg/L As(III)                    |
| BLK3                    | 9.79 | 21.1      | BS3       | 9.75 | 21.6      |  |   | 1 mg/L As(III)                      |
| BLK4                    | 9.79 | 21.1      | BS4       | 9.76 | 21.6      |  |   | 5 mg/L As (III)                     |
| BLK5                    | 9.80 | 21.1      | BS5       | 9.76 | 21.6      |  |   | 0.4 mg/L As(V)                      |
| BLK6                    | 9.80 | 21.0      | BS6       | 9.77 | 21.6      |  |   | 1 mg/L As(V)                        |
| BLK7/ BLKA              | 9.81 | 21.0      | BS7/BSA   | 9.77 | 21.5      |  |   | 5 mg/L As (V)                       |
| BLK8/ BLKB              | 9.81 | 20.9      | BS8/BSB   | 9.77 | 21.6      |  |   | 20 mg/L As (V)                      |

| pH Measurements Summary |      |           |                             |      |           | Batch: B180807   |   |                                     |
|-------------------------|------|-----------|-----------------------------|------|-----------|--|---|-------------------------------------|
| Sample ID               | pH   | Temp (°C) | Associated Matrix QC Sample | pH   | Temp (°C) | Synthetic GW pH Control  | Soil:Solution Ratio, Equilibration Time           | Arsenic Spikes Used in Synthetic GW |
| 1809005-35              | 9.57 | 21.0      | B180807-DUP1                | 9.60 | 20.4      | 0.01 M Na <sub>2</sub> CO <sub>3</sub> /<br>0.01 M NaHCO <sub>3</sub><br>Buffer Used in Synthetic GW | 1:10 Solution Ratio,<br>72 hrs Equilibration Time | 20 mg/L As (III)                    |
| 1809005-36              | 9.62 | 21.1      | B180807-DUP2                | 9.69 | 20.9      |  |   | 0.4 mg/L As(III)                    |
| 1809005-37              | 9.65 | 21.1      | B180807-DUP3                | 9.68 | 21.1      |  |   | 1 mg/L As(III)                      |
| 1809005-38              | 9.67 | 21.1      | B180807-DUP4                | 9.68 | 21.1      |  |   | 5 mg/L As (III)                     |
| 1809005-39              | 9.65 | 21.1      | B180807-DUP5                | 9.68 | 21.2      |  |   | 20 mg/L As (III)                    |
| 1809005-40              | 9.11 | 21.2      | B180807-DUP6                | 9.12 | 21.1      |  |   | 0.4 mg/L As(III)                    |
| 1809005-41              | 9.08 | 21.1      | B180807-DUP7                | 9.06 | 21.1      |  |   | 1 mg/L As(III)                      |
| 1809005-42              | 9.02 | 21.1      | B180807-DUP8                | 9.07 | 20.0      |  |   | 5 mg/L As (III)                     |
| 1809005-43              | 9.10 | 21.1      | B180807-DUP9                | 9.12 | 21.1      |  |   | 20 mg/L As (III)                    |
| 1809005-44              | 9.07 | 21.2      | B180807-DUPA                | 9.06 | 21.1      |  |   | 0.4 mg/L As(V)                      |
| 1809005-45              | 9.05 | 21.2      | B180807-DUPB                | 9.08 | 21.2      |  |   | 1 mg/L As(V)                        |
| 1809005-46              | 9.08 | 21.2      | B180807-DUPC                | 9.05 | 21.2      |  |   | 5 mg/L As (V)                       |
| 1809005-47              | 9.06 | 21.2      | B180807-DUPD                | 9.08 | 21.2      |  |   | 20 mg/L As (V)                      |
| 1809005-48              | 9.05 | 21.2      | B180807-DUPE                | 9.03 | 21.3      |  |   | 0.4 mg/L As(III)                    |
| 1809005-49              | 9.04 | 21.2      | B180807-DUPF                | 9.01 | 21.2      |  |   | 1 mg/L As(III)                      |
| 1809005-50              | 9.03 | 21.2      | B180807-DUPG                | 9.02 | 21.2      |  |   | 5 mg/L As (III)                     |
| 1809005-51              | 9.03 | 20.5      | B180807-DUPH                | 8.93 | 21.4      |  |   | 20 mg/L As (III)                    |
| 1809005-52              | 9.03 | 21.1      | B180807-DUPI                | 8.98 | 21.4      |  |   | 0.4 mg/L As(V)                      |
| 1809005-53              | 9.06 | 21.3      | B180807-DUPJ                | 9.64 | 21.5      |  |   | 1 mg/L As(V)                        |
| 1809005-54              | 8.81 | 21.4      | B180807-DUPK                | 9.03 | 21.4      |  |   | 5 mg/L As (V)                       |
| 1809005-55              | 9.03 | 21.4      | B180807-DUPL                | 9.03 | 21.4      | 20 mg/L As (V)   |   |                                     |



**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B172830  
**Lab Matrix:** Soil/Sediment  
**Method:** SM 2540G

| Sample       | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| B172830-DUP1 | Duplicate, (1737058-11)<br>%TS | 91.44  |       | 91.80  | %     |              | 0.4% 15      |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B180556  
**Lab Matrix:** Soil/Sediment  
**Method:** SM 2540G

| Sample       | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180556-DUP1 | Duplicate, (1809005-19)<br>%TS | 99.49  |       | 99.49  | %     |              | 0% 15        |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B180805  
**Lab Matrix:** Soil/Sediment  
**Method:** SM 2540G

| Sample       | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180805-DUP1 | Duplicate, (1809005-36)<br>%TS | 99.67  |       | 99.68  | %     |              | 0.01% 15     |



## Accuracy & Precision Summary

Batch: B180807  
Lab Matrix: Soil/Sediment  
Method: EPA 150.1

| Sample       | Analyte                       | Native | Spike | Result | Units        | REC & Limits | RPD & Limits |
|--------------|-------------------------------|--------|-------|--------|--------------|--------------|--------------|
| B180807-DUP1 | Duplicate, (1809005-35)<br>pH | 9.57   |       | 9.60   | pH units dry |              | 0.3% 200     |
| B180807-DUP2 | Duplicate, (1809005-36)<br>pH | 9.62   |       | 9.69   | pH units dry |              | 0.7% 200     |
| B180807-DUP3 | Duplicate, (1809005-37)<br>pH | 9.65   |       | 9.68   | pH units dry |              | 0.3% 200     |
| B180807-DUP4 | Duplicate, (1809005-38)<br>pH | 9.67   |       | 9.68   | pH units dry |              | 0.1% 200     |
| B180807-DUP5 | Duplicate, (1809005-39)<br>pH | 9.65   |       | 9.68   | pH units dry |              | 0.3% 200     |
| B180807-DUP6 | Duplicate, (1809005-40)<br>pH | 9.11   |       | 9.12   | pH units dry |              | 0.1% 200     |
| B180807-DUP7 | Duplicate, (1809005-41)<br>pH | 9.08   |       | 9.06   | pH units dry |              | 0.2% 200     |
| B180807-DUP8 | Duplicate, (1809005-42)<br>pH | 9.02   |       | 9.07   | pH units dry |              | 0.6% 200     |
| B180807-DUP9 | Duplicate, (1809005-43)<br>pH | 9.10   |       | 9.12   | pH units dry |              | 0.2% 200     |
| B180807-DUPA | Duplicate, (1809005-44)<br>pH | 9.07   |       | 9.06   | pH units dry |              | 0.1% 200     |
| B180807-DUPB | Duplicate, (1809005-45)<br>pH | 9.05   |       | 9.08   | pH units dry |              | 0.3% 200     |
| B180807-DUPC | Duplicate, (1809005-46)<br>pH | 9.08   |       | 9.05   | pH units dry |              | 0.3% 200     |



## Accuracy & Precision Summary

Batch: B180807  
 Lab Matrix: Soil/Sediment  
 Method: EPA 150.1

| Sample       | Analyte                       | Native | Spike | Result | Units        | REC & Limits | RPD & Limits |
|--------------|-------------------------------|--------|-------|--------|--------------|--------------|--------------|
| B180807-DUPD | Duplicate, (1809005-47)<br>pH | 9.06   |       | 9.08   | pH units dry |              | 0.2% 200     |
| B180807-DUPE | Duplicate, (1809005-48)<br>pH | 9.05   |       | 9.03   | pH units dry |              | 0.2% 200     |
| B180807-DUPF | Duplicate, (1809005-49)<br>pH | 9.04   |       | 9.01   | pH units dry |              | 0.3% 200     |
| B180807-DUPG | Duplicate, (1809005-50)<br>pH | 9.03   |       | 9.02   | pH units dry |              | 0.1% 200     |
| B180807-DUPH | Duplicate, (1809005-51)<br>pH | 9.03   |       | 8.93   | pH units dry |              | 1% 200       |
| B180807-DUPI | Duplicate, (1809005-52)<br>pH | 9.03   |       | 8.98   | pH units dry |              | 0.6% 200     |
| B180807-DUPJ | Duplicate, (1809005-53)<br>pH | 9.06   |       | 9.64   | pH units dry |              | 6% 200       |
| B180807-DUPK | Duplicate, (1809005-54)<br>pH | 8.81   |       | 9.03   | pH units dry |              | 2% 200       |
| B180807-DUPL | Duplicate, (1809005-55)<br>pH | 9.03   |       | 9.03   | pH units dry |              | 0% 200       |



## Accuracy & Precision Summary

Batch: B180959  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180959-BS2  | Blank Spike, (1810006)<br>As(BAT)   |        | 3.977 | 4.502  | mg/kg | 113% 75-125  |              |
| B180959-BS3  | Blank Spike, (1810006)<br>As(BAT)   |        | 9.965 | 9.613  | mg/kg | 96% 75-125   |              |
| B180959-BS4  | Blank Spike, (1810006)<br>As(BAT)   |        | 49.83 | 45.85  | mg/kg | 92% 75-125   |              |
| B180959-BS5  | Blank Spike, (1810007)<br>As(BAT)   |        | 3.962 | 4.455  | mg/kg | 112% 75-125  |              |
| B180959-BS6  | Blank Spike, (1810007)<br>As(BAT)   |        | 10.00 | 10.58  | mg/kg | 106% 75-125  |              |
| B180959-BS9  | Blank Spike, (1810006)<br>As(BAT)   |        | 201.2 | 187.9  | mg/kg | 93% 75-125   |              |
| B180959-BSA  | Blank Spike, (1810007)<br>As(BAT)   |        | 50.00 | 52.36  | mg/kg | 105% 75-125  |              |
| B180959-BSB  | Blank Spike, (1810007)<br>As(BAT)   |        | 198.1 | 214.1  | mg/kg | 108% 75-125  |              |
| B180959-DUP1 | Duplicate, (1809005-35)<br>As(BAT)  | 178.2  |       | 178.2  | mg/kg |              | 0.03% 30     |
| B180959-PS1  | Post Spike, (1809005-35)<br>As(BAT) | 178.2  | 24.96 | 202.3  | mg/kg | 97% 75-125   |              |
| B180959-PS2  | Post Spike, (1809005-35)<br>As(BAT) | 178.2  | 24.96 | 203.3  | mg/kg | 100% 75-125  |              |
| B180959-DUP2 | Duplicate, (1809005-36)<br>As(BAT)  | 3.335  |       | 3.385  | mg/kg |              | 2% 30        |



## Accuracy & Precision Summary

Batch: B180959  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180959-PS3  | Post Spike, (1809005-36)<br>As(BAT) | 3.335  | 2.484 | 5.978  | mg/kg | 106% 75-125  |              |
| B180959-PS4  | Post Spike, (1809005-36)<br>As(BAT) | 3.335  | 2.484 | 6.051  | mg/kg | 109% 75-125  |              |
| B180959-DUP3 | Duplicate, (1809005-37)<br>As(BAT)  | 8.435  |       | 8.337  | mg/kg |              | 1% 30        |
| B180959-PS5  | Post Spike, (1809005-37)<br>As(BAT) | 8.435  | 2.480 | 11.20  | mg/kg | 111% 75-125  |              |
| B180959-PS6  | Post Spike, (1809005-37)<br>As(BAT) | 8.435  | 2.480 | 11.17  | mg/kg | 110% 75-125  |              |
| B180959-DUP4 | Duplicate, (1809005-38)<br>As(BAT)  | 44.61  |       | 44.40  | mg/kg |              | 0.5% 30      |
| B180959-PS7  | Post Spike, (1809005-38)<br>As(BAT) | 44.61  | 9.970 | 53.44  | mg/kg | 89% 75-125   |              |
| B180959-PS8  | Post Spike, (1809005-38)<br>As(BAT) | 44.61  | 9.970 | 53.86  | mg/kg | 93% 75-125   |              |
| B180959-DUP5 | Duplicate, (1809005-39)<br>As(BAT)  | 174.9  |       | 173.5  | mg/kg |              | 0.8% 30      |
| B180959-DUP6 | Duplicate, (1809005-40)<br>As(BAT)  | 1.580  |       | 1.556  | mg/kg |              | 2% 30        |
| B180959-DUP7 | Duplicate, (1809005-41)<br>As(BAT)  | 3.512  |       | 3.489  | mg/kg |              | 0.7% 30      |
| B180959-DUP8 | Duplicate, (1809005-42)<br>As(BAT)  | 15.33  |       | 15.34  | mg/kg |              | 0.1% 30      |



## Accuracy & Precision Summary

Batch: B180959  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180959-DUP9 | Duplicate, (1809005-43)<br>As(BAT)  | 80.44  |       | 82.88  | mg/kg |              | 3% 30        |
| B180959-DUPA | Duplicate, (1809005-44)<br>As(BAT)  | 1.979  |       | 1.964  | mg/kg |              | 0.7% 30      |
| B180959-PS9  | Post Spike, (1809005-44)<br>As(BAT) | 1.979  | 2.488 | 4.638  | mg/kg | 107% 75-125  |              |
| B180959-PSA  | Post Spike, (1809005-44)<br>As(BAT) | 1.979  | 2.488 | 4.685  | mg/kg | 109% 75-125  |              |
| B180959-DUPB | Duplicate, (1809005-45)<br>As(BAT)  | 5.051  |       | 5.103  | mg/kg |              | 1% 30        |
| B180959-PSB  | Post Spike, (1809005-45)<br>As(BAT) | 5.051  | 2.512 | 7.733  | mg/kg | 107% 75-125  |              |
| B180959-PSC  | Post Spike, (1809005-45)<br>As(BAT) | 5.051  | 2.512 | 7.682  | mg/kg | 105% 75-125  |              |
| B180959-DUPC | Duplicate, (1809005-46)<br>As(BAT)  | 28.60  |       | 28.45  | mg/kg |              | 0.5% 30      |
| B180959-PSD  | Post Spike, (1809005-46)<br>As(BAT) | 28.60  | 9.924 | 38.87  | mg/kg | 103% 75-125  |              |
| B180959-PSE  | Post Spike, (1809005-46)<br>As(BAT) | 28.60  | 9.924 | 38.74  | mg/kg | 102% 75-125  |              |
| B180959-DUPD | Duplicate, (1809005-47)<br>As(BAT)  | 144.2  |       | 144.6  | mg/kg |              | 0.3% 30      |
| B180959-PSF  | Post Spike, (1809005-47)<br>As(BAT) | 144.2  | 25.15 | 170.4  | mg/kg | 104% 75-125  |              |





## Accuracy & Precision Summary

Batch: B180959  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180959-PSG  | Post Spike, (1809005-47)<br>As(BAT) | 144.2  | 25.15 | 165.5  | mg/kg | 85% 75-125   |              |
| B180959-DUPE | Duplicate, (1809005-48)<br>As(BAT)  | 1.829  |       | 2.615  | mg/kg |              | 35% 30       |
| B180959-DUPF | Duplicate, (1809005-49)<br>As(BAT)  | 6.252  |       | 6.375  | mg/kg |              | 2% 30        |
| B180959-DUPG | Duplicate, (1809005-50)<br>As(BAT)  | 25.38  |       | 31.76  | mg/kg |              | 22% 30       |
| B180959-DUPH | Duplicate, (1809005-51)<br>As(BAT)  | 127.7  |       | 126.6  | mg/kg |              | 0.9% 30      |
| B180959-DUPI | Duplicate, (1809005-52)<br>As(BAT)  | 2.615  |       | 2.587  | mg/kg |              | 1% 30        |
| B180959-DUPJ | Duplicate, (1809005-53)<br>As(BAT)  | 6.474  |       | 6.635  | mg/kg |              | 2% 30        |
| B180959-DUPK | Duplicate, (1809005-54)<br>As(BAT)  | 28.99  |       | 31.61  | mg/kg |              | 9% 30        |
| B180959-DUPL | Duplicate, (1809005-55)<br>As(BAT)  | 146.9  |       | 147.7  | mg/kg |              | 0.6% 30      |



## Accuracy & Precision Summary

Batch: B180960  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180960-BS2  | Blank Spike, (1810006)<br>As(BAT)   |        | 397.7 | 450.2  | µg/L  | 113% 75-125  |              |
| B180960-BS3  | Blank Spike, (1810006)<br>As(BAT)   |        | 996.5 | 961.3  | µg/L  | 96% 75-125   |              |
| B180960-BS4  | Blank Spike, (1810006)<br>As(BAT)   |        | 4983  | 4585   | µg/L  | 92% 75-125   |              |
| B180960-BS5  | Blank Spike, (1810007)<br>As(BAT)   |        | 396.2 | 445.5  | µg/L  | 112% 75-125  |              |
| B180960-BS6  | Blank Spike, (1810007)<br>As(BAT)   |        | 1000  | 1058   | µg/L  | 106% 75-125  |              |
| B180960-BS9  | Blank Spike, (1810006)<br>As(BAT)   |        | 20120 | 18790  | µg/L  | 93% 75-125   |              |
| B180960-BSA  | Blank Spike, (1810007)<br>As(BAT)   |        | 5000  | 5236   | µg/L  | 105% 75-125  |              |
| B180960-BSB  | Blank Spike, (1810007)<br>As(BAT)   |        | 19810 | 21410  | µg/L  | 108% 75-125  |              |
| B180960-DUP1 | Duplicate, (1809005-35)<br>As(BAT)  | 17850  |       | 17840  | µg/L  |              | 0.04% 20     |
| B180960-PS1  | Post Spike, (1809005-35)<br>As(BAT) | 17850  | 2500  | 20260  | µg/L  | 97% 75-125   |              |
| B180960-PS2  | Post Spike, (1809005-35)<br>As(BAT) | 17850  | 2500  | 20360  | µg/L  | 100% 75-125  |              |
| B180960-DUP2 | Duplicate, (1809005-36)<br>As(BAT)  | 335.6  |       | 341.3  | µg/L  |              | 2% 20        |



## Accuracy & Precision Summary

Batch: B180960  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180960-PS3  | Post Spike, (1809005-36)<br>As(BAT) | 335.6  | 250.0 | 601.7  | µg/L  | 106% 75-125  |              |
| B180960-PS4  | Post Spike, (1809005-36)<br>As(BAT) | 335.6  | 250.0 | 609.0  | µg/L  | 109% 75-125  |              |
| B180960-DUP3 | Duplicate, (1809005-37)<br>As(BAT)  | 850.4  |       | 836.3  | µg/L  |              | 2% 20        |
| B180960-PS5  | Post Spike, (1809005-37)<br>As(BAT) | 850.4  | 250.0 | 1129   | µg/L  | 111% 75-125  |              |
| B180960-PS6  | Post Spike, (1809005-37)<br>As(BAT) | 850.4  | 250.0 | 1126   | µg/L  | 110% 75-125  |              |
| B180960-DUP4 | Duplicate, (1809005-38)<br>As(BAT)  | 4475   |       | 4482   | µg/L  |              | 0.2% 20      |
| B180960-PS7  | Post Spike, (1809005-38)<br>As(BAT) | 4475   | 1000  | 5361   | µg/L  | 89% 75-125   |              |
| B180960-PS8  | Post Spike, (1809005-38)<br>As(BAT) | 4475   | 1000  | 5402   | µg/L  | 93% 75-125   |              |
| B180960-DUP5 | Duplicate, (1809005-39)<br>As(BAT)  | 17580  |       | 17590  | µg/L  |              | 0.05% 20     |
| B180960-DUP6 | Duplicate, (1809005-40)<br>As(BAT)  | 158.6  |       | 155.5  | µg/L  |              | 2% 20        |
| B180960-DUP7 | Duplicate, (1809005-41)<br>As(BAT)  | 350.9  |       | 348.3  | µg/L  |              | 0.7% 20      |
| B180960-DUP8 | Duplicate, (1809005-42)<br>As(BAT)  | 1546   |       | 1531   | µg/L  |              | 1% 20        |



## Accuracy & Precision Summary

Batch: B180960  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180960-DUP9 | Duplicate, (1809005-43)<br>As(BAT)  | 8033   |       | 8265   | µg/L  |              | 3% 20        |
| B180960-DUPA | Duplicate, (1809005-44)<br>As(BAT)  | 198.8  |       | 195.5  | µg/L  |              | 2% 20        |
| B180960-PS9  | Post Spike, (1809005-44)<br>As(BAT) | 198.8  | 250.0 | 466.1  | µg/L  | 107% 75-125  |              |
| B180960-PSA  | Post Spike, (1809005-44)<br>As(BAT) | 198.8  | 250.0 | 470.8  | µg/L  | 109% 75-125  |              |
| B180960-DUPB | Duplicate, (1809005-45)<br>As(BAT)  | 502.7  |       | 509.7  | µg/L  |              | 1% 20        |
| B180960-PSB  | Post Spike, (1809005-45)<br>As(BAT) | 502.7  | 250.0 | 769.6  | µg/L  | 107% 75-125  |              |
| B180960-PSC  | Post Spike, (1809005-45)<br>As(BAT) | 502.7  | 250.0 | 764.5  | µg/L  | 105% 75-125  |              |
| B180960-DUPC | Duplicate, (1809005-46)<br>As(BAT)  | 2882   |       | 2876   | µg/L  |              | 0.2% 20      |
| B180960-PSD  | Post Spike, (1809005-46)<br>As(BAT) | 2882   | 1000  | 3917   | µg/L  | 103% 75-125  |              |
| B180960-PSE  | Post Spike, (1809005-46)<br>As(BAT) | 2882   | 1000  | 3904   | µg/L  | 102% 75-125  |              |
| B180960-DUPD | Duplicate, (1809005-47)<br>As(BAT)  | 14330  |       | 14550  | µg/L  |              | 2% 20        |
| B180960-PSF  | Post Spike, (1809005-47)<br>As(BAT) | 14330  | 2500  | 16930  | µg/L  | 104% 75-125  |              |



## Accuracy & Precision Summary

Batch: B180960  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180960-PSG  | Post Spike, (1809005-47)<br>As(BAT) | 14330  | 2500  | 16450  | µg/L  | 85% 75-125   |              |
| B180960-DUPE | Duplicate, (1809005-48)<br>As(BAT)  | 183.9  |       | 262.5  | µg/L  |              | 35% 20       |
| B180960-DUPF | Duplicate, (1809005-49)<br>As(BAT)  | 634.2  |       | 633.8  | µg/L  |              | 0.07% 20     |
| B180960-DUPG | Duplicate, (1809005-50)<br>As(BAT)  | 2532   |       | 3165   | µg/L  |              | 22% 20       |
| B180960-DUPH | Duplicate, (1809005-51)<br>As(BAT)  | 12820  |       | 12680  | µg/L  |              | 1% 20        |
| B180960-DUPI | Duplicate, (1809005-52)<br>As(BAT)  | 263.3  |       | 259.5  | µg/L  |              | 1% 20        |
| B180960-DUPJ | Duplicate, (1809005-53)<br>As(BAT)  | 648.3  |       | 669.5  | µg/L  |              | 3% 20        |
| B180960-DUPK | Duplicate, (1809005-54)<br>As(BAT)  | 2929   |       | 3173   | µg/L  |              | 8% 20        |
| B180960-DUPL | Duplicate, (1809005-55)<br>As(BAT)  | 14770  |       | 15060  | µg/L  |              | 2% 20        |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B172830  
**Matrix:** Soil/Sediment  
**Method:** SM 2540G  
**Analyte:** %TS

| Sample          | Result       | Units |
|-----------------|--------------|-------|
| B172830-BLK1    | -0.58        | %     |
| B172830-BLK2    | -0.44        | %     |
| <b>Average:</b> | <b>-0.51</b> |       |
| <b>Limit:</b>   | <b>0.35</b>  |       |

**MDL:** 0.11  
**MRL:** 0.35

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B180556  
**Matrix:** Soil/Sediment  
**Method:** SM 2540G  
**Analyte:** %TS

| Sample          | Result       | Units |
|-----------------|--------------|-------|
| B180556-BLK1    | -0.01        | %     |
| B180556-BLK2    | -0.01        | %     |
| <b>Average:</b> | <b>-0.01</b> |       |
| <b>Limit:</b>   | <b>0.02</b>  |       |

**MDL:** 0.005  
**MRL:** 0.02

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B180805  
**Matrix:** Soil/Sediment  
**Method:** SM 2540G  
**Analyte:** %TS

| Sample          | Result       | Units |
|-----------------|--------------|-------|
| B180805-BLK1    | 0.00         | %     |
| B180805-BLK2    | -2.61        | %     |
| <b>Average:</b> | <b>-1.31</b> |       |
| <b>Limit:</b>   | <b>0.04</b>  |       |

**MDL:** 0.01  
**MRL:** 0.04





## Method Blanks & Reporting Limits

**Batch:** B180807  
**Matrix:** Soil/Sediment  
**Method:** EPA 150.1  
**Analyte:** pH

| Sample       | Result | Units       |
|--------------|--------|-------------|
| B180807-BLK1 | 9.75   | pH units we |
| B180807-BLK2 | 9.79   | pH units we |
| B180807-BLK3 | 9.79   | pH units we |
| B180807-BLK4 | 9.79   | pH units we |
| B180807-BLK5 | 9.80   | pH units we |
| B180807-BLK6 | 9.80   | pH units we |
| B180807-BLK7 | 9.81   | pH units we |
| B180807-BLK8 | 9.81   | pH units we |

Method Blanks are spiked synthetic ground water solutions that have undergone the tumbling process along with the client samples. There are eight (8) distinct synthetic groundwater solutions, as described in the table below.

| Sample ID  | Synthetic GW pH Control  | Soil:Solution Ratio, Equilibration Time        | Arsenic Spikes Used in Synthetic GW |
|------------|--|--|-------------------------------------|
| BLK1/BLK9  | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub> Buffer Used in Synthetic GW | 1:10 Solution Ratio, 72 hrs Equilibration Time | 20 mg/L As (III)                    |
| BLK2       |  |  | 0.4 mg/L As(III)                    |
| BLK3       |  |  | 1 mg/L As(III)                      |
| BLK4       |  |  | 5 mg/L As (III)                     |
| BLK5       |  |  | 0.4 mg/L As(V)                      |
| BLK6       |  |  | 1 mg/L As(V)                        |
| BLK7/ BLKA |  |  | 5 mg/L As (V)                       |
| BLK8/ BLKB |  |  | 20 mg/L As (V)                      |



## Method Blanks & Reporting Limits

**Batch:** B180959  
**Matrix:** Soil/Sediment  
**Method:** EPA 6020B Mod  
**Analyte:** As(BAT)

| Sample       | Result | Units |
|--------------|--------|-------|
| B180959-BLK2 | 4.31   | mg/kg |
| B180959-BLK3 | 9.61   | mg/kg |
| B180959-BLK4 | 46.3   | mg/kg |
| B180959-BLK5 | 4.56   | mg/kg |
| B180959-BLK6 | 10.6   | mg/kg |
| B180959-BLK9 | 190    | mg/kg |
| B180959-BLKA | 53.3   | mg/kg |
| B180959-BLKB | 210    | mg/kg |

**MDL:** 0.010  
**MRL:** 0.100

Method Blanks are spiked synthetic ground water solutions that have undergone the tumbling process along with the client samples. There are eight (8) distinct synthetic groundwater solutions, as described in the table below.

| Sample ID  | Synthetic GW pH Control  | Soil:Solution Ratio, Equilibration Time        | Arsenic Spikes Used in Synthetic GW |
|------------|--|--|-------------------------------------|
| BLK1/BLK9  | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub> Buffer Used in Synthetic GW | 1:10 Solution Ratio, 72 hrs Equilibration Time | 20 mg/L As (III)                    |
| BLK2       |  |  | 0.4 mg/L As(III)                    |
| BLK3       |  |  | 1 mg/L As(III)                      |
| BLK4       |  |  | 5 mg/L As (III)                     |
| BLK5       |  |  | 0.4 mg/L As(V)                      |
| BLK6       |  |  | 1 mg/L As(V)                        |
| BLK7/ BLKA |  |  | 5 mg/L As (V)                       |
| BLK8/ BLKB |  |  | 20 mg/L As (V)                      |



## Method Blanks & Reporting Limits

**Batch:** B180960  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** As(BAT)

| Sample       | Result | Units |
|--------------|--------|-------|
| B180960-BLK2 | 431    | µg/L  |
| B180960-BLK3 | 961    | µg/L  |
| B180960-BLK4 | 4630   | µg/L  |
| B180960-BLK5 | 456    | µg/L  |
| B180960-BLK6 | 1060   | µg/L  |
| B180960-BLK9 | 19000  | µg/L  |
| B180960-BLKA | 5330   | µg/L  |
| B180960-BLKB | 21000  | µg/L  |

**MDL:** 1.00  
**MRL:** 10.0

Method Blanks are spiked synthetic ground water solutions that have undergone the tumbling process along with the client samples. There are eight (8) distinct synthetic groundwater solutions, as described in the table below.

| Sample ID  | Synthetic GW pH Control  | Soil:Solution Ratio, Equilibration Time        | Arsenic Spikes Used in Synthetic GW |
|------------|--|--|-------------------------------------|
| BLK1/BLK9  | 0.01 M Na <sub>2</sub> CO <sub>3</sub> / 0.01 M NaHCO <sub>3</sub> Buffer Used in Synthetic GW | 1:10 Solution Ratio, 72 hrs Equilibration Time | 20 mg/L As (III)                    |
| BLK2       |  |  | 0.4 mg/L As(III)                    |
| BLK3       |  |  | 1 mg/L As(III)                      |
| BLK4       |  |  | 5 mg/L As (III)                     |
| BLK5       |  |  | 0.4 mg/L As(V)                      |
| BLK6       |  |  | 1 mg/L As(V)                        |
| BLK7/ BLKA |  |  | 5 mg/L As (V)                       |
| BLK8/ BLKB |  |  | 20 mg/L As (V)                      |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-01                |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-2.0-4.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                               | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-02                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-13.0-15.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-03                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-23.0-25.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-04                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-31.0-33.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

Project ID: PTC-OA1701-4  
PM: Jeremy Maute



BAL Report 1809005 Round 4.1  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-05                |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/15/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-2.5-4.5 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/15/2017  |       |    |                    |
| Des                                      | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-06                  |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/15/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-11.5-13.5 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/15/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-07                  |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/15/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-23.0-25.0 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/15/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-08                  |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/15/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-31.5-33.5 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/15/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-09                  |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 09/20/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-10.0-12.0 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 09/21/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 3 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-10                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-17.3-20.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

| <b>Lab ID:</b> 1809005-11                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-22.5-25.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

| <b>Lab ID:</b> 1809005-12                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-35.8-36.5 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-13           |                   |             | <b>Report Matrix:</b> Water-D |                     |              | <b>Collected:</b> 09/21/2017 |                    |
|-------------------------------------|-------------------|-------------|-------------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-713-2-092117-(20) |                   |             | <b>Sample Type:</b> Sample    |                     |              | <b>Received:</b> 09/21/2017  |                    |
| <b>Des</b>                          | <b>Container</b>  | <b>Size</b> | <b>Lot</b>                    | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| B                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| C                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| D                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| E                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| F                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| G                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| H                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| I                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| J                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |

| <b>Lab ID:</b> 1809005-14                    |                  |             | <b>Report Matrix:</b> Soil |                     |              | <b>Collected:</b> 10/03/2017 |                    |
|--|------------------|-------------|----------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> SO-122+60-0-SED-100317-0-0.33 |                  |             | <b>Sample Type:</b> Sample |                     |              | <b>Received:</b> 10/03/2017  |                    |
| <b>Des</b>                                   | <b>Container</b> | <b>Size</b> | <b>Lot</b>                 | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz         | 17-0058                    | None                | n/a          |                              | Cooler 6 - 1809005 |
| B  | EXTRA_VOL        | 8oz         | 17-0058                    | None                | n/a          |                              | Cooler 6 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-15                    |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/03/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-125+50-0-SED-100317-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/03/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 6 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 6 - 1809005 |

| <b>Lab ID:</b> 1809005-16                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-120+75-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |

| <b>Lab ID:</b> 1809005-17                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-125+00-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |

| <b>Lab ID:</b> 1809005-18                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-128+50-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |





## Sample Containers

**Lab ID:** 1809005-19      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 0.4 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-20      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 1 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-21      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 5 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-22      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 20 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-23      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-24      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
1 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-25      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
5 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-26      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
20 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-27      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 0.4 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-28      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 1 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-29      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 5 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-30      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 20 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-31      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-32      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
1 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-33      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
5 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-34      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
20 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-35      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
20 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-36      **Report Matrix:** Soil  
**Sample:** SO-PTC-002-091317-23.0-25.0\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(III)      **Collected:** 09/13/2017  
**Received:** 09/13/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |

**Lab ID:** 1809005-37      **Report Matrix:** Soil  
**Sample:** SO-PTC-002-091317-23.0-25.0\_With Buff,      **Sample Type:** Sample  
1 mg/L As(III)      **Collected:** 09/13/2017  
**Received:** 09/13/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |

**Lab ID:** 1809005-38      **Report Matrix:** Soil  
**Sample:** SO-PTC-002-091317-23.0-25.0\_With Buff,      **Sample Type:** Sample  
5 mg/L As(III)      **Collected:** 09/13/2017  
**Received:** 09/13/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-39      **Report Matrix:** Soil  
**Sample:** SO-PTC-002-091317-23.0-25.0\_With Buff,      **Sample Type:** Sample  
20 mg/L As(III)      **Collected:** 09/13/2017  
**Received:** 09/13/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |

**Lab ID:** 1809005-40      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-41      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 1      **Sample Type:** Sample  
mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-42      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 5      **Sample Type:** Sample  
mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-43 **Report Matrix:** Soil **Collected:** 09/15/2017  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 20 **Sample Type:** Sample **Received:** 09/15/2017  
mg/L As(III)

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-44 **Report Matrix:** Soil **Collected:** 09/15/2017  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 0.4 mg/L As(V) **Sample Type:** Sample **Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-45 **Report Matrix:** Soil **Collected:** 09/15/2017  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 1 mg/L As(V) **Sample Type:** Sample **Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-46 **Report Matrix:** Soil **Collected:** 09/15/2017  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 5 mg/L As(V) **Sample Type:** Sample **Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-47      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 20 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-48      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff, 0.4 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-49      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff, 1 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-50      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff, 5 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |





## Sample Containers

**Lab ID:** 1809005-51      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff,      **Sample Type:** Sample  
20 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-52      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-53      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff,      **Sample Type:** Sample  
1 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-54      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff,      **Sample Type:** Sample  
5 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-55      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff, 20 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-56      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No Buff, 0.4 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-57      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No Buff, 1 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-58      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No Buff, 5 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-59      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-60      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-61      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-62      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-63      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-64      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-65      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-66      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-67      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-68      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-69      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-70      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-71

**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No  
Buff, 20 mg/L As(V)

**Report Matrix:** Soil  
**Sample Type:** Sample

**Collected:** 10/04/2017  
**Received:** 10/06/2017

| <b>Des</b> | <b>Container</b> | <b>Size</b> | <b>Lot</b> | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b>    |
|------------|------------------|-------------|------------|---------------------|--------------|-----------|-----------------------|
| A          | Jar HDPE         | 8oz         | 17-0058    | None                | n/a          |           | Cooler 7 -<br>1809005 |
| B          | EXTRA_VOL        | 8oz         | 17-0058    | None                | n/a          |           | Cooler 7 -<br>1809005 |



## Shipping Containers

### Cooler 2 - 1809005

Received: September 15, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: -11.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? Yes  
Custody seals intact? Yes  
COC present? Yes

### Cooler 3 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: -19.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 4 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Ice  
Temperature: 15.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #10

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 5 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Ice  
Temperature: 14.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #10

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 6 - 1809005

Received: October 3, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 1.0 °C

Description: Cooler 6  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 7 - 1809005

Received: September 15, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 2.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 7 - 1809005

Received: October 6, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 2.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.1  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### **Cooler 8 - 1809005**

**Received:** September 13, 2017 14:00  
**Tracking No:** n/a via Courier  
**Coolant Type:** Blue ice  
**Temperature:** 12.0 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR #8

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes





# Chain-of-Custody Form

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466 / LUKE KERNER  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: [Signature] For BAK use only Date: 9/13/17

Work Order ID: \_\_\_\_\_ Time: 1400

Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_  
Port of Tacoma, PO Box 1537, Tacoma, WA 98401-1537  
Troy Bussey (PIONEER), 5205 Corporate Center, Cl. St. Ste A, Olympia, WA 98507

Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection                   |                      | Client Sample Info |                                 |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|------------------------------|----------------------|--------------------|---------------------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                         | Time                 | Matrix Type        | Number of Containers            | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID                    |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 1  | SO-PTC-002-091317-2.0-4.0    | 9/13/17 8:30         | SOIL               | 1                               |                 |                   |  |   | X   |   |   |   |  |          | Specify Here                         |
| 2  | SO-PTC-002-091317-13.0-15.0  | 9/13/17 8:40         | SOIL               | 1                               |                 |                   |  |   | X   |   |   |   |  |          |                                      |
| 3  | SO-PTC-002-091317-23.0-25.0  | 9/13/17 8:50         | SOIL               | 1                               |                 |                   |  |   | X   |   |   |   |  |          |                                      |
| 4  | SO-PTC-002-091317-31.0-33.0  | 9/13/17 9:20         | SOIL               | 1                               |                 |                   |  |   | X   |   |   |   |  |          |                                      |
| 5  | <del>SO-PTC-208-091317</del> |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 6  | <del>SO-PTC-205-091317</del> |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 7  |                              |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 8  |                              |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 9  |                              |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 10   |                              |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
|  | Trip Blank (specify)         |                      |                    |                                 |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>[Signature]</u>  |                              | Date: <u>9/13/17</u> | Time: <u>1300</u>  | Relinquished By: _____          |                 |                   |  | Date: _____   | Time: _____   |   |   |   |  |          |                                      |
| Received By: <u>[Signature]</u>  |                              | Date: <u>9/13/17</u> | Time: <u>1303</u>  | Total Number of Packages: _____ |                 |                   |  |   |   |   |   |   |  |          |                                      |

**Print**



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466 / *dgcooper*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

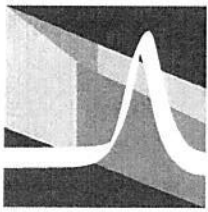
Received by: *Lauren Miller* For BAL use only Date: 9/15/17  
 Work Order ID: \_\_\_\_\_ Time: 1630  
 Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_  
18804 North Creek Parkway, Suite 100, Bothell, WA 98011-3127  
 Troy Bussey (PIONEER)  
 360 Corporate Center Dr., Ste. 200  
 Olympia, WA 98513

Email Receipt Confirmation? Yes  
 BAL PM: **Jeremy Maute**

| Requested TAT (business days)  | Collection                              |                    | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |              |
|--|---|--------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|--------------|
|  | Date                                    | Time               | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID                               |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 1  | J0-PTC-101-091417-8.2-10.2              | 9/14/17            | 1350                            | SOIL                 | 1               |                   | X  | X   |   |   |   |   |  |          |                                      | Specify Here |
| 2  | J0-PTC-101-091417-19.3-20.3             | 9/14/17            | 1405                            | SOIL                 | 1               |                   | X  | X   |   |   |   |   |  |          |                                      |              |
| 3  | J0-PTC-001-091517-2.5-4.5               | 9/15/17            | 11:50                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 4  | J0-PTC-001-091517-11.5-13.5             | 9/15/17            | 12:00                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 5  | J0-PTC-001-091517-23.0-25.0             | 9/15/17            | 12:20                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 6  | J0-PTC-001-091517-31.5-33.5             | 9/15/17            | 11:20                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 7  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 8  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 9  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 10   |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | Trip Blank (specify)                    |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| Relinquished By: <i>Lauren Miller</i>  | Date: <del>9/14/17</del> <i>9/15/17</i> | Time: <i>12:35</i> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |                                      |              |
| Received By: <i>Armando Amato</i>  | Date: <i>9.15.17</i>                    | Time: <i>12:35</i> | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |





**BROOKS  
APPLIED  
LABS**

# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466 / *L. Kerner*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Lawson* For BAL Use Only Date: *9/21/17*  
 Work Order ID: \_\_\_\_\_ Time: *9:10*  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |                   | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|-------------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time              | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Sample ID  | Specify Here                            |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 1  | SO-PTC-129-092017-10.0-12.0             | 9/20/17 1315      | SOIL                      | 1                    |                 |                   | X  | X   | X   |   |   |   |  |          |                                      |
| 2  | SO-PTC-129-092017-17.3-20.0             | 9/20/17 1320      | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |          |                                      |
| 3  | SO-PTC-129-092017-22.5-25.0             | 9/20/17 1325      | SOIL                      | 1                    |                 |                   | X  | X   | X   |   |   |   |  |          |                                      |
| 4  | SO-PTC-129-092017-35.8-36.5             | 9/20/17 1500      | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |          |                                      |
| 5  |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 6  |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 7  |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 8  |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 9  |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 10   |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   |                   |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <i>[Signature]</i>  | Date: <i>9/21/17</i>                    | Time: <i>9:10</i> | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |  |          |                                      |
| Received By: <i>[Signature]</i>  | Date: <i>9/21/17</i>                    | Time: <i>9:10</i> | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |

Page \_\_\_\_ of \_\_\_\_ List Hazardous Contaminants: \_\_\_\_\_

samples@brooksupplied.com | brooksupplied.com

**Print**



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

BAL Report 1809005 Round 4.1

Received by: Jo Walk For BAL use only Date: 9/21/17  
Work Order ID: \_\_\_\_\_ Time: 14:11  
Project ID: \_\_\_\_\_

Client: Pioneer Technologies PO Number: 79227 Mailing Address: \_\_\_\_\_  
Contact: Troy Bursey (burseyt@uspioneer.com) Phone: 360-570-1700  
Client Project ID: Arkema FSDG Inv Email: Burseyt@uspioneer.com Email Receipt Confirmation? (Yes/No) \_\_\_\_\_  
Samples Collected By: L. Hank 2083167223 BAL PM: \_\_\_\_\_

| Requested TAT<br>(business days)<br><br><input type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Collection                  |                | Client Sample Info |                      |                             |   | BAL Analyses Required |                     |                            |   |   |            |   | Comments        |  |
|---|-----------------------------|----------------|--------------------|----------------------|-----------------------------|---|-----------------------|---------------------|----------------------------|---|---|------------|---|-----------------|--|
|   | Date                        | Time           | Matrix Type        | Number of Containers | Field Filtered?<br>(Yes/No) | Preservation Type<br>HCl /HNO <sub>3</sub> /Other | Total Hg, EPA 1631    | Methyl Hg, EPA 1630 | ICP-MS Metals<br>(specify) | As Species (specify)<br>InOrg, III, V, MMA, DMA | Se Species (specify)<br>Se(IV), Se(VI), SeCN, Unknown | Filtration | Other (specify)<br>Unimpacted Groundwater for Batch<br>Absorption Tests | Other (specify) | Specify Here   |
| Sample ID   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 1   | <u>GW-713-2-092117-(20)</u> | <u>9/21/17</u> | <u>1145</u>        | <u>WATER</u>         | <u>9-22</u><br><u>1-16</u>  | <u>Yes</u>  |                       |                     |                            |   |   |            | <input checked="" type="checkbox"/>                                     |                 | <u>Unimpacted Groundwater for Batch Absorption Tests</u> |
| 2   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 3   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 4   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 5   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 6   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 7   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 8   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 9   |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
| 10  |                             |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | Trip Blank                  |                |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |

Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Total Number of Packages: 2





# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Lawrence [Signature] Date: 10/3/17  
 Work Order ID: 1737058 Time: 1310  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT (business days)  | Collection                               |                      | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |  |              |
|--|--|----------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|--|--------------|
|  | Date                                     | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |  |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID                                |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| 1  | <del>SD-122+60-0-5ED-100317-0-0-33</del> |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| 2  | SD-122+60-0-5ED-100317-0-0-33            | 10/3/17              | 10:20              | Soil                 | 1               | No                        |  |   | X   |   |   |   |  |          |                                      |  | Specify Here |
| 3  | SD-125+50-0-5ED-100317-0-0-33            | 10/3/17              | 920                | Soil                 | 1               | No                        |  |   | X   |   |   |   |  |          |                                      |  |              |
| 4  |  |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| 5  |  |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| 6  |  |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| 7  |  |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| 8  |  |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| 9  |  |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| 10   |  |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
|  | Trip Blank (specify)                     |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |  |              |
| Relinquished By: <u>[Signature]</u>  |  | Date: <u>10/3/17</u> |                    | Time: <u>1310</u>    |                 | Relinquished By:          |  |   |   |   | Date:   |   | Time:  |          |                                      |  |              |
| Received By:   |  | Date:                |                    | Time:                |                 | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |  |              |

Print



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Jeremy Maute For BAL use only BAL Report 1809005 Round 4.1  
 Date: 10/6/17  
 Work Order ID: \_\_\_\_\_ Time: 12:30  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct SE, Ste A  
Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection           |                                 | Client Sample Info |                           |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|----------------------|---------------------------------|--------------------|---------------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                 | Time                            | Matrix Type        | Number of Containers      | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID            |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          | Specify Here                         |
|   | 1                    | SD-120+75-ST1-SED-100417-0-0.33 | 10/4/17            | 1330                      | SOIL            | 1                 |  |   |   | X   |   |   |  |          |                                      |
|   | 2                    | SD-175+00-ST1-SED-100417-1-0.33 | ↓                  | 1430                      | SOIL            | 1                 |  |   |   | X   |   |   |  |          |                                      |
|   | 3                    | SD-128+50-ST1-SED-100417-0-0.33 | ↓                  | 1530                      | SOIL            | 1                 |  |   |   | X   |   |   |  |          |                                      |
|   | 4                    |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 5                    |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 6                    |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 7                    |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 8                    |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 9                    |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | 10                   |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | Trip Blank (specify) |                                 |                    |                           |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Maute</u>   |                      | Date: <u>10/6/17</u>            | Time:              | Relinquished By:          |                 |                   | Date:  | Time:   |   |   |   |   |  |          |                                      |
| Received By:  |                      | Date:                           | Time:              | Total Number of Packages: |                 |                   |  |   |   |   |   |   |  |          |                                      |

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18804 North Creek Parkway, Ste 100, Bothell, WA 98011 • USA • T: 206 632 6206 F: 206 632 6017 • [info@brooksapplied.com](mailto:info@brooksapplied.com)

May 8, 2018

PIONEER Technologies Corporation  
ATTN: Troy Bussey Jr., P.E.  
5205 Corporate Ctr. Ct. SE, Ste. A  
Olympia, WA 98503-5901  
[busseyt@uspioneer.com](mailto:busseyt@uspioneer.com)

RE: Project PTC-OA1701-4

Client Project: Arkema FS Data Gap

Mr. Troy Bussey,

On September 13<sup>th</sup> through October 3<sup>rd</sup>, 2017, Brooks Applied Labs (BAL) received seventeen (17) soil/sediment samples.

Shortly after receipt, all submitted core samples were unpacked in a glove box maintained under anoxic conditions, split into appropriate sample containers, and then stored according to BAL SOPs. All sample fractions designated for batch adsorption testing (BAT) were frozen pending the client's decision on which samples to analyze. The client notified BAL that the client samples SO-122+60-0-SED-100317-0-0.33 and SO-125+00-ST1-SED-100417-0-0.33 should undergo Batch Adsorption Testing (BAT), in accordance with the procedure submitted by the client titled **Design for Arkema BAT Round 4\_032818**. This report only contains the BAT results for the client samples SO-122+60-0-SED-100317-0-0.33 and SO-125+00-ST1-SED-100417-0-0.33 processed according to the document **Design for Arkema BAT Round 4\_032818**.

All samples were stored and prepped anoxically in an oxygen free glove box. All samples were received, prepared, analyzed, and stored according to BAL SOPs and EPA methodology.

#### Batch Adsorption Testing (BAT)

Prior to the BAT, the soil samples were dried in a glove box maintained under anoxic conditions and then sieved using a 2mm mesh size. An aliquot of each sieved sample was then taken for dry weight determination; in accordance with the BAT protocol, the resulting dry weights were used to calculate the appropriate sample masses required for the testing. All subsequent testing was performed on the original sieved sample portions.

In accordance with client instructions, eight (8) separate synthetic groundwater solutions were prepared for the BAT. Reagent solutions were degassed with an N<sub>2</sub> purge prior to use. All solutions were initially prepared as NaCl solutions with a total dissolved solids (TDS) = 23,000 mg/L. The resulting solutions were spiked with As(III) and As(V) spikes according to the following table.

**Spiked GW Solutions**

| Sample ID* | Sample ID** | Synthetic GW pH Control                                   | Soil:Solution Ratio, Equilibration Time         | Arsenic Spikes Used in Synthetic GW |
|------------|-------------|---|---|-------------------------------------|
| BLK1       | BS1         | No Buffer Used in Synthetic GW, TDS $\approx$ 23,000 mg/L | 1:10 Solution Ratio, 72 hrs. Equilibration Time | 0.4 mg/L As(III)                    |
| BLK2       | BS2         |   |   | 1 mg/L As(III)                      |
| BLK3       | BS3         |   |   | 5 mg/L As (III)                     |
| BLK4       | BS4         |   |   | 20 mg/L As (III)                    |
| BLK5       | BS5         |   |   | 0.4 mg/L As(V)                      |
| BLK6       | BS6         |   |   | 1 mg/L As(V)                        |
| BLK7       | BS7         |   |   | 5 mg/L As (V)                       |
| BLK8       | BS8         |   |   | 20 mg/L As (V)                      |

\*Method Blank Sample = Spiked Synthetic GW (method blank sample subjected to tumbling step - same as client samples).

\*\* Blank Spike Sample = Spiked Synthetic GW (not subjected to tumbling step).

An aliquot of each spiked synthetic groundwater solution was split into a separate container, acidified to a pH < 2 with nitric acid, and then analyzed for determination of the initial arsenic concentration. These fractions are identified as blank spike samples in the attached *Accuracy and Precision* tables.

Aliquots of the spiked synthetic groundwater were also added to empty sample containers and tumbled alongside the client samples to monitor for potential losses during the extraction procedure. These fractions are identified as method blank samples in the attached *Accuracy and Precision* tables.

Aliquots of the remaining spiked synthetic groundwater were added to an appropriate mass of each sample to achieve the requested soil: solution ratio of 1:10. For each client sample, a matrix duplicate sample has been prepped with the client samples. The following table describes the source sample each Matrix QC sample is associated with.



**M/MD Sample ID Cross Reference Table**

| Sample ID  | Associated Matrix QC Sample | Synthetic GW pH Control                                   | Soil:Solution Ratio, Equilibration Time         | Arsenic Spikes Used in Synthetic GW |
|------------|-----------------------------|---|---|-------------------------------------|
| 1809005-56 | DUP1                        | No Buffer Used in Synthetic GW, TDS $\approx$ 23,000 mg/L | 1:10 Solution Ratio, 72 hrs. Equilibration Time | 0.4 mg/L As(III)                    |
| 1809005-57 | DUP2                        |   |   | 1 mg/L As(III)                      |
| 1809005-58 | DUP3                        |   |   | 5 mg/L As (III)                     |
| 1809005-59 | DUP4                        |   |   | 20 mg/L As (III)                    |
| 1809005-60 | DUP5                        |   |   | 0.4 mg/L As(V)                      |
| 1809005-61 | DUP6                        |   |   | 1 mg/L As(V)                        |
| 1809005-62 | DUP7                        |   |   | 5 mg/L As (V)                       |
| 1809005-63 | DUP8                        |   |   | 20 mg/L As (V)                      |
| 1809005-64 | DUP9                        |   |   | 0.4 mg/L As(III)                    |
| 1809005-65 | DUPA                        |   |   | 1 mg/L As(III)                      |
| 1809005-66 | DUPB                        |   |   | 5 mg/L As (III)                     |
| 1809005-67 | DUPC                        |   |   | 20 mg/L As (III)                    |
| 1809005-68 | DUPD                        |   |   | 0.4 mg/L As(V)                      |
| 1809005-69 | DUPE                        |   |   | 1 mg/L As(V)                        |
| 1809005-70 | DUPF                        | 5 mg/L As (V)   |   |                                     |
| 1809005-71 | DUPG                        | 20 mg/L As (V)  |   |                                     |

All prepared samples were then placed on a rotary tumbler (kept inside the glove box) and tumbled for 72 hours. After the designed equilibration time had elapsed an aliquot of each resulting extract was filtered (0.45 $\mu$ m), acidified to a pH < 2 with nitric acid, and then reserved for dissolved As analysis. The remaining extract for each sample was evaluated for pH and temperature.

#### pH and Temperature Measurements

The pH of all extracts was measured via a modified SM2540B using a calibrated pH electrode.

The measured values for pH and temperature are included in the results section of the report.

### Total Metals Quantitation of the BAT Extracts

An aliquot of each extract was directly analyzed for As using inductively coupled plasma triple quadrupole mass spectrometry (ICP-QQQ-MS). The ICP-QQQ-MS uses advanced interference removal techniques to ensure accuracy of the sample results. For more information, please visit the *Interference Reduction Technology* section on our website.

A matrix duplicate (MD) was performed for each designated spiked synthetic groundwater. Due to the nature of the BAT, no matrix spikes could be performed during the extraction procedure. Instead, analytical spikes (designated as B18xxx-PSx) were prepared at the time of analysis to demonstrate the accuracy of the analyses.

The results are reported using a BAT (Solids) basis, where the masses and volumes used in the batch absorption tumbling step are factored into the final results (Batch B180925). The results are also reported by BAT (Aqueous) basis, where the final results are reported using the values obtained by direct analysis of the filtered aqueous fractions from the batch absorption test (Batch B181065).

Arsenic recoveries for all method blanks and blank spike samples were within acceptable ranges.

Several continuous calibration blank (CCB) samples yielded arsenic results greater than the associated MRLs. In all cases the bracketed samples were greater than 10x the elevated CCB result; the elevated CCBs should have minimal impact on data quality. Consequently, no qualification of data is required.

Internal standard recoveries for the client samples 1809005-67 (126%) and 1809005-71 (130%) were greater than the upper control limit of 125%. The internal standard recoveries for the QC samples B180925-DUPC (127%), B180925-PS3 (127%), B180925-DUPF (126%), and B180925-DUPG (134%) were greater than 125%. The arsenic recovery for B180925-PS3 is acceptable, at 94%. All laboratory duplicate samples in this batch demonstrated acceptable precision, including the laboratory duplicate samples with elevated internal standard recoveries. All samples with internal standard recovery outliers were re-analyzed, confirming the original results. Since the passing QC and the good agreement between separate analytical runs demonstrated that the internal standards appropriately corrected for variability in sensitivity within the analytical platform, no corrective action was necessary. The client sample results and QC results from the initial run were reported without qualification.

The results were *not* method blank corrected, as described in the calculations section of the relevant BAL SOPs and were evaluated using reporting limits adjusted to account for sample aliquot size. Please refer to the *Sample Results* page for sample-specific MDLs, MRLs, and other details.

In instances where a post spike sample was spiked at a level less than the native sample, the recoveries are not considered valid indicators of data quality. However, these results are reported as a demonstration of precision. When the spiking levels were  $\leq 25\%$  of the native sample concentrations, the recoveries were not reported (**NR**).

All data was reported without qualification and all associated quality control sample results met the acceptance criteria.

BAL, an accredited laboratory, certifies that the reported results of all analyses for which BAL is NELAP accredited meet all NELAP requirements. For more information please see the *Report Information* page in your report.

Please feel free to contact me if you have any questions regarding this report.

Sincerely,

A handwritten signature in black ink, appearing to read 'J. Maute', with a stylized flourish extending to the right.

Jeremy Maute  
Senior Project Manager  
Brooks Applied Labs



## Report Information

### Laboratory Accreditation

BAL is accredited by the *National Environmental Laboratory Accreditation Program* (NELAP) through the State of Florida Department of Health, Bureau of Laboratories (E87982) and is certified to perform many environmental analyses. BAL is also certified by many other states to perform environmental analyses. For a current list of our accreditations/certifications, please visit our website at <http://www.brooksapplied.com/resources/certificates-permits/>. Results reported relate only to the samples listed in the report.

### Field Quality Control Samples

Please be notified that certain EPA methods require the collection of field quality control samples of an appropriate type and frequency; failure to do so is considered a deviation from some methods and for compliance purposes should only be done with the approval of regulatory authorities. Please see the specific EPA methods for details regarding required field quality control samples.

### Common Abbreviations

|            |                                     |            |                                    |
|------------|-------------------------------------|------------|------------------------------------|
| <b>AR</b>  | as received                         | <b>MS</b>  | matrix spike                       |
| <b>BAL</b> | Brooks Applied Labs                 | <b>MSD</b> | matrix spike duplicate             |
| <b>BLK</b> | method blank                        | <b>ND</b>  | non-detect                         |
| <b>BS</b>  | blank spike                         | <b>NR</b>  | non-reportable                     |
| <b>CAL</b> | calibration standard                | <b>N/C</b> | not calculated                     |
| <b>CCB</b> | continuing calibration blank        | <b>PS</b>  | post preparation spike             |
| <b>CCV</b> | continuing calibration verification | <b>REC</b> | percent recovery                   |
| <b>COC</b> | chain of custody record             | <b>RPD</b> | relative percent difference        |
| <b>D</b>   | dissolved fraction                  | <b>SCV</b> | secondary calibration verification |
| <b>DUP</b> | duplicate                           | <b>SOP</b> | standard operating procedure       |
| <b>IBL</b> | instrument blank                    | <b>SRM</b> | standard reference material        |
| <b>ICV</b> | initial calibration verification    | <b>T</b>   | total fraction                     |
| <b>MDL</b> | method detection limit              | <b>TR</b>  | total recoverable fraction         |
| <b>MRL</b> | method reporting limit              |            |                                    |

### Definition of Data Qualifiers

(Effective 9/23/09)

|            |   |
|------------|---|
| <b>E</b>   | An estimated value due to the presence of interferences. A full explanation is presented in the narrative.                        |
| <b>H</b>   | Holding time and/or preservation requirements not met. Please see narrative for explanation.                                      |
| <b>J</b>   | Detected by the instrument, the result is > the MDL but ≤ the MRL. Result is reported and considered an estimate.                 |
| <b>J-1</b> | Estimated value. A full explanation is presented in the narrative.  |
| <b>M</b>   | Duplicate precision (RPD) was not within acceptance criteria. Please see narrative for explanation.                               |
| <b>N</b>   | Spike recovery was not within acceptance criteria. Please see narrative for explanation.  |
| <b>R</b>   | Rejected, unusable value. A full explanation is presented in the narrative.   |
| <b>U</b>   | Result is ≤ the MDL or client requested reporting limit (CRRL). Result reported as the MDL or CRRL.                               |
| <b>X</b>   | Result is not BLK-corrected and is within 10x the absolute value of the highest detectable BLK in the batch. Result is estimated. |

These qualifiers are based on those previously utilized by Brooks Applied Labs, those found in the EPA SOW ILM03.0, Exhibit B, Section III, pg. B-18, and the USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review; USEPA; January 2010. These supersede all previous qualifiers ever employed by BAL.



## Sample Information

| Sample  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---|------------|---------------|--------|------------|------------|
| SO-PTC-002-091317-2.0-4.0                               | 1809005-01 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-13.0-15.0                             | 1809005-02 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0                             | 1809005-03 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-31.0-33.0                             | 1809005-04 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-001-091517-2.5-4.5                               | 1809005-05 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5                             | 1809005-06 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0                             | 1809005-07 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-31.5-33.5                             | 1809005-08 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-129-092017-10.0-12.0                             | 1809005-09 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-17.3-20.0                             | 1809005-10 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-22.5-25.0                             | 1809005-11 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| SO-PTC-129-092017-35.8-36.5                             | 1809005-12 | Soil          | Sample | 09/20/2017 | 09/21/2017 |
| GW-713-2-092117-(20)                                    | 1809005-13 | Water-D       | Sample | 09/21/2017 | 09/21/2017 |
| SO-122+60-0-SED-100317-0-0.33                           | 1809005-14 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-125+50-0-SED-100317-0-0.33                           | 1809005-15 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-120+75-ST1-SED-100417-0-0.33                         | 1809005-16 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33                         | 1809005-17 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-128+50-ST1-SED-100417-0-0.33                         | 1809005-18 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 0.4 mg/L As(III)   | 1809005-19 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 1 mg/L As(III)     | 1809005-20 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 5 mg/L As(III)     | 1809005-21 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 20 mg/L As(III)    | 1809005-22 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 0.4 mg/L As(III) | 1809005-23 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 1 mg/L As(III)   | 1809005-24 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 5 mg/L As(III)   | 1809005-25 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 20 mg/L As(III)  | 1809005-26 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 0.4 mg/L As(V)     | 1809005-27 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 1 mg/L As(V)       | 1809005-28 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 5 mg/L As(V)       | 1809005-29 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_No Buff, 20 mg/L As(V)      | 1809005-30 | Soil          | Sample | 09/15/2017 | 09/15/2017 |



## Sample Information

| Sample  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---|------------|---------------|--------|------------|------------|
| SO-PTC-001-091517-23.0-25.0_With Buff, 0.4 mg/L As(V)   | 1809005-31 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 1 mg/L As(V)     | 1809005-32 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 5 mg/L As(V)     | 1809005-33 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 20 mg/L As(V)    | 1809005-34 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-23.0-25.0_With Buff, 20 mg/L As(III)  | 1809005-35 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-002-091317-23.0-25.0_With Buff, 0.4 mg/L As(III) | 1809005-36 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0_With Buff, 1 mg/L As(III)   | 1809005-37 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0_With Buff, 5 mg/L As(III)   | 1809005-38 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-002-091317-23.0-25.0_With Buff, 20 mg/L As(III)  | 1809005-39 | Soil          | Sample | 09/13/2017 | 09/13/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 0.4 mg/L As(III)   | 1809005-40 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 1 mg/L As(III)     | 1809005-41 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 5 mg/L As(III)     | 1809005-42 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 20 mg/L As(III)    | 1809005-43 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 0.4 mg/L As(V)     | 1809005-44 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 1 mg/L As(V)       | 1809005-45 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 5 mg/L As(V)       | 1809005-46 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-2.5-4.5_With Buff, 20 mg/L As(V)      | 1809005-47 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 0.4 mg/L As(III) | 1809005-48 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 1 mg/L As(III)   | 1809005-49 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 5 mg/L As(III)   | 1809005-50 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 20 mg/L As(III)  | 1809005-51 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 0.4 mg/L As(V)   | 1809005-52 | Soil          | Sample | 09/15/2017 | 09/15/2017 |



## Sample Information

| Sample  | Lab ID     | Report Matrix | Type   | Sampled    | Received   |
|---|------------|---------------|--------|------------|------------|
| SO-PTC-001-091517-11.5-13.5_With Buff, 1 mg/L As(V)       | 1809005-53 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 5 mg/L As(V)       | 1809005-54 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-PTC-001-091517-11.5-13.5_With Buff, 20 mg/L As(V)      | 1809005-55 | Soil          | Sample | 09/15/2017 | 09/15/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 0.4 mg/L As(III)   | 1809005-56 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 1 mg/L As(III)     | 1809005-57 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 5 mg/L As(III)     | 1809005-58 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 20 mg/L As(III)    | 1809005-59 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 0.4 mg/L As(V)     | 1809005-60 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 1 mg/L As(V)       | 1809005-61 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 5 mg/L As(V)       | 1809005-62 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-122+60-0-SED-100317-0-0.33_No Buff, 20 mg/L As(V)      | 1809005-63 | Soil          | Sample | 10/03/2017 | 10/03/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 0.4 mg/L As(III) | 1809005-64 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 1 mg/L As(III)   | 1809005-65 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 5 mg/L As(III)   | 1809005-66 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 20 mg/L As(III)  | 1809005-67 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 0.4 mg/L As(V)   | 1809005-68 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 1 mg/L As(V)     | 1809005-69 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 5 mg/L As(V)     | 1809005-70 | Soil          | Sample | 10/04/2017 | 10/06/2017 |
| SO-125+00-ST1-SED-100417-0-0.33_No Buff, 20 mg/L As(V)    | 1809005-71 | Soil          | Sample | 10/04/2017 | 10/06/2017 |



## Batch Summary

| Analyte | Lab Matrix    | Method        | Prepared   | Analyzed   | Batch   | Sequence |
|---------|---------------|---------------|------------|------------|---------|----------|
| %TS     | Soil/Sediment | SM 2540G      | 04/16/2018 | 04/25/2018 | B180926 | N/A      |
| As(BAT) | Soil/Sediment | EPA 6020B Mod | 04/20/2018 | 04/27/2018 | B180925 | 1800575  |
| As(BAT) | Water         | EPA 1638 Mod  | 04/20/2018 | 04/27/2018 | B181065 | 1800575  |
| pH      | Water         | EPA 150.1     | 04/20/2018 | 05/02/2018 | B181075 | N/A      |

BAT = Batch Absorption Testing

B181065: BAT results in terms of ug/L (*i.e.* direct analysis of BAT fractions).

B180925: BAT Results in terms of mg/kg-dry (*i.e.* mass, final volumes, and %TS used to calculate results).|





## Sample Results

| Sample   | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit         | Batch   | Sequence |
|--|---------|---------------|-------|--------|-----------|-------|-------|--------------|---------|----------|
| <b>SO-122+60-0-SED-100317-0-0.33_No Buff, 0.4 mg/L As(III)</b> |         |               |       |        |           |       |       |              |         |          |
| 1809005-56   | %TS     | Soil          | NA    | 97.25  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-56   | As(BAT) | Soil          | dry   | 0.760  |           | 0.005 | 0.010 | mg/kg        | B180925 | 1800575  |
| 1809005-56   | As(BAT) | Soil          | dry   | 76.0   |           | 0.450 | 1.00  | µg/L         | B181065 | 1800575  |
| 1809005-56   | pH      | Soil          | dry   | 7.89   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-122+60-0-SED-100317-0-0.33_No Buff, 1 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-57   | %TS     | Soil          | NA    | 97.25  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-57   | As(BAT) | Soil          | dry   | 2.63   |           | 0.005 | 0.010 | mg/kg        | B180925 | 1800575  |
| 1809005-57   | As(BAT) | Soil          | dry   | 262    |           | 0.450 | 1.00  | µg/L         | B181065 | 1800575  |
| 1809005-57   | pH      | Soil          | dry   | 8.18   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-122+60-0-SED-100317-0-0.33_No Buff, 5 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-58   | %TS     | Soil          | NA    | 97.25  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-58   | As(BAT) | Soil          | dry   | 16.2   |           | 0.018 | 0.040 | mg/kg        | B180925 | 1800575  |
| 1809005-58   | As(BAT) | Soil          | dry   | 1620   |           | 1.80  | 4.00  | µg/L         | B181065 | 1800575  |
| 1809005-58   | pH      | Soil          | dry   | 8.13   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-122+60-0-SED-100317-0-0.33_No Buff, 20 mg/L As(III)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-59   | %TS     | Soil          | NA    | 97.25  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-59   | As(BAT) | Soil          | dry   | 94.7   |           | 0.045 | 0.100 | mg/kg        | B180925 | 1800575  |
| 1809005-59   | As(BAT) | Soil          | dry   | 9510   |           | 4.50  | 10.0  | µg/L         | B181065 | 1800575  |
| 1809005-59   | pH      | Soil          | dry   | 8.34   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-122+60-0-SED-100317-0-0.33_No Buff, 0.4 mg/L As(V)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-60   | %TS     | Soil          | NA    | 97.25  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-60   | As(BAT) | Soil          | dry   | 1.01   |           | 0.005 | 0.010 | mg/kg        | B180925 | 1800575  |
| 1809005-60   | As(BAT) | Soil          | dry   | 101    |           | 0.450 | 1.00  | µg/L         | B181065 | 1800575  |
| 1809005-60   | pH      | Soil          | dry   | 8.28   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-122+60-0-SED-100317-0-0.33_No Buff, 1 mg/L As(V)</b>     |         |               |       |        |           |       |       |              |         |          |
| 1809005-61   | %TS     | Soil          | NA    | 97.25  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-61   | As(BAT) | Soil          | dry   | 2.60   |           | 0.005 | 0.010 | mg/kg        | B180925 | 1800575  |
| 1809005-61   | As(BAT) | Soil          | dry   | 259    |           | 0.450 | 1.00  | µg/L         | B181065 | 1800575  |
| 1809005-61   | pH      | Soil          | dry   | 8.22   |           |       |       | pH units dry | B181075 | N/A      |



## Sample Results

| Sample   | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit         | Batch   | Sequence |
|--|---------|---------------|-------|--------|-----------|-------|-------|--------------|---------|----------|
| <b>SO-122+60-0-SED-100317-0-0.33_No Buff, 5 mg/L As(V)</b>       |         |               |       |        |           |       |       |              |         |          |
| 1809005-62   | %TS     | Soil          | NA    | 97.25  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-62   | As(BAT) | Soil          | dry   | 18.5   |           | 0.018 | 0.040 | mg/kg        | B180925 | 1800575  |
| 1809005-62   | As(BAT) | Soil          | dry   | 1860   |           | 1.80  | 4.00  | µg/L         | B181065 | 1800575  |
| 1809005-62   | pH      | Soil          | dry   | 8.21   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-122+60-0-SED-100317-0-0.33_No Buff, 20 mg/L As(V)</b>      |         |               |       |        |           |       |       |              |         |          |
| 1809005-63   | %TS     | Soil          | NA    | 97.25  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-63   | As(BAT) | Soil          | dry   | 125    |           | 0.045 | 0.100 | mg/kg        | B180925 | 1800575  |
| 1809005-63   | As(BAT) | Soil          | dry   | 12600  |           | 4.50  | 10.0  | µg/L         | B181065 | 1800575  |
| 1809005-63   | pH      | Soil          | dry   | 8.21   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-125+00-ST1-SED-100417-0-0.33_No Buff, 0.4 mg/L As(III)</b> |         |               |       |        |           |       |       |              |         |          |
| 1809005-64   | %TS     | Soil          | NA    | 98.83  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-64   | As(BAT) | Soil          | dry   | 2.82   |           | 0.005 | 0.010 | mg/kg        | B180925 | 1800575  |
| 1809005-64   | As(BAT) | Soil          | dry   | 281    |           | 0.450 | 1.00  | µg/L         | B181065 | 1800575  |
| 1809005-64   | pH      | Soil          | dry   | 8.61   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-125+00-ST1-SED-100417-0-0.33_No Buff, 1 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-65   | %TS     | Soil          | NA    | 98.83  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-65   | As(BAT) | Soil          | dry   | 7.39   |           | 0.005 | 0.010 | mg/kg        | B180925 | 1800575  |
| 1809005-65   | As(BAT) | Soil          | dry   | 738    |           | 0.450 | 1.00  | µg/L         | B181065 | 1800575  |
| 1809005-65   | pH      | Soil          | dry   | 8.66   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-125+00-ST1-SED-100417-0-0.33_No Buff, 5 mg/L As(III)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-66   | %TS     | Soil          | NA    | 98.83  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-66   | As(BAT) | Soil          | dry   | 33.6   |           | 0.018 | 0.040 | mg/kg        | B180925 | 1800575  |
| 1809005-66   | As(BAT) | Soil          | dry   | 3360   |           | 1.80  | 4.00  | µg/L         | B181065 | 1800575  |
| 1809005-66   | pH      | Soil          | dry   | 8.63   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-125+00-ST1-SED-100417-0-0.33_No Buff, 20 mg/L As(III)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-67   | %TS     | Soil          | NA    | 98.83  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-67   | As(BAT) | Soil          | dry   | 137    |           | 0.045 | 0.100 | mg/kg        | B180925 | 1800575  |
| 1809005-67   | As(BAT) | Soil          | dry   | 13600  |           | 4.50  | 10.0  | µg/L         | B181065 | 1800575  |
| 1809005-67   | pH      | Soil          | dry   | 8.64   |           |       |       | pH units dry | B181075 | N/A      |



## Sample Results

| Sample   | Analyte | Report Matrix | Basis | Result | Qualifier | MDL   | MRL   | Unit         | Batch   | Sequence |
|--|---------|---------------|-------|--------|-----------|-------|-------|--------------|---------|----------|
| <b>SO-125+00-ST1-SED-100417-0-0.33_No Buff, 0.4 mg/L As(V)</b> |         |               |       |        |           |       |       |              |         |          |
| 1809005-68   | %TS     | Soil          | NA    | 98.83  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-68   | As(BAT) | Soil          | dry   | 3.18   |           | 0.005 | 0.010 | mg/kg        | B180925 | 1800575  |
| 1809005-68   | As(BAT) | Soil          | dry   | 318    |           | 0.450 | 1.00  | µg/L         | B181065 | 1800575  |
| 1809005-68   | pH      | Soil          | dry   | 8.68   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-125+00-ST1-SED-100417-0-0.33_No Buff, 1 mg/L As(V)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-69   | %TS     | Soil          | NA    | 98.83  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-69   | As(BAT) | Soil          | dry   | 6.82   |           | 0.004 | 0.010 | mg/kg        | B180925 | 1800575  |
| 1809005-69   | As(BAT) | Soil          | dry   | 684    |           | 0.450 | 1.00  | µg/L         | B181065 | 1800575  |
| 1809005-69   | pH      | Soil          | dry   | 8.63   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-125+00-ST1-SED-100417-0-0.33_No Buff, 5 mg/L As(V)</b>   |         |               |       |        |           |       |       |              |         |          |
| 1809005-70   | %TS     | Soil          | NA    | 98.83  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-70   | As(BAT) | Soil          | dry   | 35.8   |           | 0.018 | 0.040 | mg/kg        | B180925 | 1800575  |
| 1809005-70   | As(BAT) | Soil          | dry   | 3560   |           | 1.80  | 4.00  | µg/L         | B181065 | 1800575  |
| 1809005-70   | pH      | Soil          | dry   | 8.61   |           |       |       | pH units dry | B181075 | N/A      |
| <b>SO-125+00-ST1-SED-100417-0-0.33_No Buff, 20 mg/L As(V)</b>  |         |               |       |        |           |       |       |              |         |          |
| 1809005-71   | %TS     | Soil          | NA    | 98.83  |           | 0.004 | 0.01  | %            | B180926 | N/A      |
| 1809005-71   | As(BAT) | Soil          | dry   | 169    |           | 0.045 | 0.100 | mg/kg        | B180925 | 1800575  |
| 1809005-71   | As(BAT) | Soil          | dry   | 16900  |           | 4.50  | 10.0  | µg/L         | B181065 | 1800575  |
| 1809005-71   | pH      | Soil          | dry   | 8.69   |           |       |       | pH units dry | B181075 | N/A      |



## Sample Results

| pH Measurements Summary |      |           |           |      |           | Batch: B181075                                    |   |                                     |
|-------------------------|------|-----------|-----------|------|-----------|---|---|-------------------------------------|
| Sample ID               | pH   | Temp (°C) | Sample ID | pH   | Temp (°C) | Synthetic GW pH Control                           | Soil:Solution Ratio, Equilibration Time         | Arsenic Spikes Used in Synthetic GW |
| BLK1                    | 4.49 | 22.1      | BS1       | 4.52 | 21.9      | No Buffer Used in Synthetic GW, TDS ≈ 23,000 mg/L | 1:10 Solution Ratio, 72 hrs. Equilibration Time | 0.4 mg/L As(III)                    |
| BLK2                    | 4.71 | 22.2      | BS2       | 4.67 | 22.1      |   |   | 1 mg/L As(III)                      |
| BLK3                    | 8.39 | 22.2      | BS3       | 8.24 | 22.2      |   |   | 5 mg/L As (III)                     |
| BLK4                    | 9.30 | 22.0      | BS4       | 9.35 | 22.2      |   |   | 20 mg/L As (III)                    |
| BLK5                    | 4.62 | 22.1      | BS5       | 4.76 | 22.1      |   |   | 0.4 mg/L As(V)                      |
| BLK6                    | 4.57 | 22.1      | BS6       | 4.70 | 22.0      |   |   | 1 mg/L As(V)                        |
| BLK7                    | 6.05 | 22.1      | BS7       | 6.18 | 22.1      |   |   | 5 mg/L As (V)                       |
| BLK8                    | 7.00 | 22.1      | BS8       | 7.05 | 22.2      |   |   | 20 mg/L As (V)                      |

| pH Measurements Summary |      |           |                             |      |           | Batch: B181075                                    |   |                                     |
|-------------------------|------|-----------|-----------------------------|------|-----------|---|---|-------------------------------------|
| Sample ID               | pH   | Temp (°C) | Associated Matrix QC Sample | pH   | Temp (°C) | Synthetic GW pH Control                           | Soil:Solution Ratio, Equilibration Time         | Arsenic Spikes Used in Synthetic GW |
| 1809005-56              | 7.89 | 22.4      | DUP1                        | 8.28 | 22.1      | No Buffer Used in Synthetic GW, TDS ≈ 23,000 mg/L | 1:10 Solution Ratio, 72 hrs. Equilibration Time | 0.4 mg/L As(III)                    |
| 1809005-57              | 8.18 | 22.3      | DUP2                        | 8.31 | 22.2      |   |   | 1 mg/L As(III)                      |
| 1809005-58              | 8.13 | 22.2      | DUP3                        | 8.24 | 22.2      |   |   | 5 mg/L As (III)                     |
| 1809005-59              | 8.34 | 22.2      | DUP4                        | 8.35 | 22.2      |   |   | 20 mg/L As (III)                    |
| 1809005-60              | 8.28 | 22.1      | DUP5                        | 8.23 | 22.2      |   |   | 0.4 mg/L As(V)                      |
| 1809005-61              | 8.22 | 22.1      | DUP6                        | 8.24 | 22.3      |   |   | 1 mg/L As(V)                        |
| 1809005-62              | 8.21 | 22.1      | DUP7                        | 8.18 | 22.3      |   |   | 5 mg/L As (V)                       |
| 1809005-63              | 8.21 | 22.1      | DUP8                        | 8.22 | 22.2      |   |   | 20 mg/L As (V)                      |
| 1809005-64              | 8.61 | 21.9      | DUP9                        | 8.65 | 22.3      |   |   | 0.4 mg/L As(III)                    |
| 1809005-65              | 8.66 | 22.2      | DUPA                        | 8.63 | 22.3      |   |   | 1 mg/L As(III)                      |
| 1809005-66              | 8.63 | 22.1      | DUPB                        | 8.66 | 22.3      |   |   | 5 mg/L As (III)                     |
| 1809005-67              | 8.64 | 22.1      | DUPC                        | 8.57 | 22.3      |   |   | 20 mg/L As (III)                    |
| 1809005-68              | 8.68 | 22.1      | DUPD                        | 8.67 | 22.3      |   |   | 0.4 mg/L As(V)                      |
| 1809005-69              | 8.63 | 22.1      | DUPE                        | 8.69 | 22.3      |   |   | 1 mg/L As(V)                        |
| 1809005-70              | 8.61 | 22.0      | DUPF                        | 8.69 | 22.3      |   |   | 5 mg/L As (V)                       |
| 1809005-71              | 8.69 | 22.0      | DUPG                        | 8.77 | 22.3      |   |   | 20 mg/L As (V)                      |



## Accuracy & Precision Summary

Batch: B180925  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180925-BS1  | Blank Spike, (1810006)<br>As(BAT)   |        | 4.024 | 4.121  | mg/kg | 102% 75-125  |              |
| B180925-BS2  | Blank Spike, (1810006)<br>As(BAT)   |        | 9.965 | 10.35  | mg/kg | 104% 75-125  |              |
| B180925-BS3  | Blank Spike, (1810006)<br>As(BAT)   |        | 49.83 | 46.07  | mg/kg | 92% 75-125   |              |
| B180925-BS4  | Blank Spike, (1810006)<br>As(BAT)   |        | 201.2 | 185.9  | mg/kg | 92% 75-125   |              |
| B180925-BS5  | Blank Spike, (1810007)<br>As(BAT)   |        | 3.962 | 4.605  | mg/kg | 116% 75-125  |              |
| B180925-BS6  | Blank Spike, (1810007)<br>As(BAT)   |        | 10.00 | 11.32  | mg/kg | 113% 75-125  |              |
| B180925-BS7  | Blank Spike, (1810007)<br>As(BAT)   |        | 50.00 | 52.79  | mg/kg | 106% 75-125  |              |
| B180925-BS8  | Blank Spike, (1810007)<br>As(BAT)   |        | 198.1 | 204.6  | mg/kg | 103% 75-125  |              |
| B180925-DUP1 | Duplicate, (1809005-56)<br>As(BAT)  | 0.760  |       | 0.825  | mg/kg |              | 8% 30        |
| B180925-PS1  | Post Spike, (1809005-56)<br>As(BAT) | 0.760  | 2.501 | 3.452  | mg/kg | 108% 75-125  |              |
| B180925-PS2  | Post Spike, (1809005-56)<br>As(BAT) | 0.760  | 2.501 | 3.507  | mg/kg | 110% 75-125  |              |
| B180925-DUP2 | Duplicate, (1809005-57)<br>As(BAT)  | 2.627  |       | 2.506  | mg/kg |              | 5% 30        |



## Accuracy & Precision Summary

Batch: B180925  
 Lab Matrix: Soil/Sediment  
 Method: EPA 6020B Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180925-DUP3 | Duplicate, (1809005-58)<br>As(BAT)  | 16.25  |       | 16.90  | mg/kg |              | 4% 30        |
| B180925-DUP4 | Duplicate, (1809005-59)<br>As(BAT)  | 94.75  |       | 99.20  | mg/kg |              | 5% 30        |
| B180925-DUP5 | Duplicate, (1809005-60)<br>As(BAT)  | 1.010  |       | 1.002  | mg/kg |              | 0.9% 30      |
| B180925-DUP6 | Duplicate, (1809005-61)<br>As(BAT)  | 2.596  |       | 2.706  | mg/kg |              | 4% 30        |
| B180925-DUP7 | Duplicate, (1809005-62)<br>As(BAT)  | 18.55  |       | 18.90  | mg/kg |              | 2% 30        |
| B180925-DUP8 | Duplicate, (1809005-63)<br>As(BAT)  | 125.4  |       | 127.3  | mg/kg |              | 1% 30        |
| B180925-DUP9 | Duplicate, (1809005-64)<br>As(BAT)  | 2.816  |       | 2.932  | mg/kg |              | 4% 30        |
| B180925-DUPA | Duplicate, (1809005-65)<br>As(BAT)  | 7.392  |       | 7.015  | mg/kg |              | 5% 30        |
| B180925-DUPB | Duplicate, (1809005-66)<br>As(BAT)  | 33.56  |       | 32.97  | mg/kg |              | 2% 30        |
| B180925-DUPC | Duplicate, (1809005-67)<br>As(BAT)  | 136.5  |       | 127.2  | mg/kg |              | 7% 30        |
| B180925-PS3  | Post Spike, (1809005-67)<br>As(BAT) | 136.5  | 25.03 | 160.1  | mg/kg | 94% 75-125   |              |
| B180925-PS4  | Post Spike, (1809005-67)<br>As(BAT) | 136.5  | 25.03 | 160.0  | mg/kg | 94% 75-125   |              |



## Accuracy & Precision Summary

Batch: B180925  
Lab Matrix: Soil/Sediment  
Method: EPA 6020B Mod

| Sample       | Analyte                            | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180925-DUPD | Duplicate, (1809005-68)<br>As(BAT) | 3.184  |       | 2.940  | mg/kg |              | 8% 30        |
| B180925-DUPE | Duplicate, (1809005-69)<br>As(BAT) | 6.823  |       | 7.240  | mg/kg |              | 6% 30        |
| B180925-DUPF | Duplicate, (1809005-70)<br>As(BAT) | 35.79  |       | 37.30  | mg/kg |              | 4% 30        |
| B180925-DUPG | Duplicate, (1809005-71)<br>As(BAT) | 168.9  |       | 170.1  | mg/kg |              | 0.7% 30      |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Accuracy & Precision Summary

**Batch:** B180926  
**Lab Matrix:** Soil/Sediment  
**Method:** SM 2540G

| Sample       | Analyte                        | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|--------------------------------|--------|-------|--------|-------|--------------|--------------|
| B180926-DUP1 | Duplicate, (1809005-56)<br>%TS | 97.25  |       | 96.90  | %     |              | 0.4% 15      |





## Accuracy & Precision Summary

Batch: B181065  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B181065-BS1  | Blank Spike, (1810006)<br>As(BAT)   |        | 402.4 | 412.1  | µg/L  | 102% 75-125  |              |
| B181065-BS2  | Blank Spike, (1810006)<br>As(BAT)   |        | 996.5 | 1035   | µg/L  | 104% 75-125  |              |
| B181065-BS3  | Blank Spike, (1810006)<br>As(BAT)   |        | 4983  | 4607   | µg/L  | 92% 75-125   |              |
| B181065-BS4  | Blank Spike, (1810006)<br>As(BAT)   |        | 20120 | 18590  | µg/L  | 92% 75-125   |              |
| B181065-BS5  | Blank Spike, (1810007)<br>As(BAT)   |        | 396.2 | 460.5  | µg/L  | 116% 75-125  |              |
| B181065-BS6  | Blank Spike, (1810007)<br>As(BAT)   |        | 1000  | 1132   | µg/L  | 113% 75-125  |              |
| B181065-BS7  | Blank Spike, (1810007)<br>As(BAT)   |        | 5000  | 5279   | µg/L  | 106% 75-125  |              |
| B181065-BS8  | Blank Spike, (1810007)<br>As(BAT)   |        | 19810 | 20460  | µg/L  | 103% 75-125  |              |
| B181065-DUP1 | Duplicate, (1809005-56)<br>As(BAT)  | 75.99  |       | 82.69  | µg/L  |              | 8% 20        |
| B181065-PS1  | Post Spike, (1809005-56)<br>As(BAT) | 75.99  | 250.0 | 345.0  | µg/L  | 108% 75-125  |              |
| B181065-PS2  | Post Spike, (1809005-56)<br>As(BAT) | 75.99  | 250.0 | 350.5  | µg/L  | 110% 75-125  |              |
| B181065-DUP2 | Duplicate, (1809005-57)<br>As(BAT)  | 262.2  |       | 251.8  | µg/L  |              | 4% 20        |



## Accuracy & Precision Summary

Batch: B181065  
 Lab Matrix: Water  
 Method: EPA 1638 Mod

| Sample       | Analyte                             | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|-------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B181065-DUP3 | Duplicate, (1809005-58)<br>As(BAT)  | 1620   |       | 1693   | µg/L  |              | 4% 20        |
| B181065-DUP4 | Duplicate, (1809005-59)<br>As(BAT)  | 9506   |       | 9906   | µg/L  |              | 4% 20        |
| B181065-DUP5 | Duplicate, (1809005-60)<br>As(BAT)  | 101.0  |       | 100.2  | µg/L  |              | 0.8% 20      |
| B181065-DUP6 | Duplicate, (1809005-61)<br>As(BAT)  | 259.3  |       | 271.6  | µg/L  |              | 5% 20        |
| B181065-DUP7 | Duplicate, (1809005-62)<br>As(BAT)  | 1861   |       | 1897   | µg/L  |              | 2% 20        |
| B181065-DUP8 | Duplicate, (1809005-63)<br>As(BAT)  | 12590  |       | 12700  | µg/L  |              | 0.9% 20      |
| B181065-DUP9 | Duplicate, (1809005-64)<br>As(BAT)  | 281.2  |       | 293.4  | µg/L  |              | 4% 20        |
| B181065-DUPA | Duplicate, (1809005-65)<br>As(BAT)  | 737.8  |       | 712.5  | µg/L  |              | 3% 20        |
| B181065-DUPB | Duplicate, (1809005-66)<br>As(BAT)  | 3364   |       | 3325   | µg/L  |              | 1% 20        |
| B181065-DUPC | Duplicate, (1809005-67)<br>As(BAT)  | 13640  |       | 12780  | µg/L  |              | 6% 20        |
| B181065-PS3  | Post Spike, (1809005-67)<br>As(BAT) | 13640  | 2500  | 15990  | µg/L  | 94% 75-125   |              |
| B181065-PS4  | Post Spike, (1809005-67)<br>As(BAT) | 13640  | 2500  | 15980  | µg/L  | 94% 75-125   |              |



## Accuracy & Precision Summary

Batch: B181065  
Lab Matrix: Water  
Method: EPA 1638 Mod

| Sample       | Analyte                            | Native | Spike | Result | Units | REC & Limits | RPD & Limits |
|--------------|------------------------------------|--------|-------|--------|-------|--------------|--------------|
| B181065-DUPD | Duplicate, (1809005-68)<br>As(BAT) | 318.2  |       | 292.8  | µg/L  |              | 8% 20        |
| B181065-DUPE | Duplicate, (1809005-69)<br>As(BAT) | 683.9  |       | 727.0  | µg/L  |              | 6% 20        |
| B181065-DUPF | Duplicate, (1809005-70)<br>As(BAT) | 3558   |       | 3716   | µg/L  |              | 4% 20        |
| B181065-DUPG | Duplicate, (1809005-71)<br>As(BAT) | 16880  |       | 16930  | µg/L  |              | 0.3% 20      |



## Accuracy & Precision Summary

**Batch:** B181075  
**Lab Matrix:** Water  
**Method:** EPA 150.1

| Sample       | Analyte                       | Native | Spike | Result | Units        | REC & Limits | RPD & Limits |
|--------------|-------------------------------|--------|-------|--------|--------------|--------------|--------------|
| B181075-DUP1 | Duplicate, (1809005-56)<br>pH | 7.89   |       | 8.28   | pH units dry |              | 5% 200       |
| B181075-DUP2 | Duplicate, (1809005-57)<br>pH | 8.18   |       | 8.31   | pH units dry |              | 2% 200       |
| B181075-DUP3 | Duplicate, (1809005-58)<br>pH | 8.13   |       | 8.24   | pH units dry |              | 1% 200       |
| B181075-DUP4 | Duplicate, (1809005-59)<br>pH | 8.34   |       | 8.35   | pH units dry |              | 0.1% 200     |
| B181075-DUP5 | Duplicate, (1809005-60)<br>pH | 8.28   |       | 8.23   | pH units dry |              | 0.6% 200     |
| B181075-DUP6 | Duplicate, (1809005-61)<br>pH | 8.22   |       | 8.24   | pH units dry |              | 0.2% 200     |
| B181075-DUP7 | Duplicate, (1809005-62)<br>pH | 8.21   |       | 8.18   | pH units dry |              | 0.4% 200     |
| B181075-DUP8 | Duplicate, (1809005-63)<br>pH | 8.21   |       | 8.22   | pH units dry |              | 0.1% 200     |
| B181075-DUP9 | Duplicate, (1809005-64)<br>pH | 8.61   |       | 8.65   | pH units dry |              | 0.5% 200     |
| B181075-DUPA | Duplicate, (1809005-65)<br>pH | 8.66   |       | 8.63   | pH units dry |              | 0.3% 200     |
| B181075-DUPB | Duplicate, (1809005-66)<br>pH | 8.63   |       | 8.66   | pH units dry |              | 0.3% 200     |
| B181075-DUPC | Duplicate, (1809005-67)<br>pH | 8.64   |       | 8.57   | pH units dry |              | 0.8% 200     |



## Accuracy & Precision Summary

**Batch:** B181075  
**Lab Matrix:** Water  
**Method:** EPA 150.1

| Sample       | Analyte                       | Native | Spike | Result | Units        | REC & Limits | RPD & Limits |
|--------------|-------------------------------|--------|-------|--------|--------------|--------------|--------------|
| B181075-DUPD | Duplicate, (1809005-68)<br>pH | 8.68   |       | 8.67   | pH units dry |              | 0.1% 200     |
| B181075-DUPE | Duplicate, (1809005-69)<br>pH | 8.63   |       | 8.69   | pH units dry |              | 0.7% 200     |
| B181075-DUPF | Duplicate, (1809005-70)<br>pH | 8.61   |       | 8.69   | pH units dry |              | 0.9% 200     |
| B181075-DUPG | Duplicate, (1809005-71)<br>pH | 8.69   |       | 8.77   | pH units dry |              | 0.9% 200     |



## Method Blanks & Reporting Limits

**Batch:** B180925  
**Matrix:** Soil/Sediment  
**Method:** EPA 6020B Mod  
**Analyte:** As(BAT)

| Sample       | Result | Units |
|--------------|--------|-------|
| B180925-BLK1 | 4.01   | mg/kg |
| B180925-BLK2 | 9.77   | mg/kg |
| B180925-BLK3 | 46.7   | mg/kg |
| B180925-BLK4 | 186    | mg/kg |
| B180925-BLK5 | 4.53   | mg/kg |
| B180925-BLK6 | 11.2   | mg/kg |
| B180925-BLK7 | 52.6   | mg/kg |
| B180925-BLK8 | 208    | mg/kg |

**MDL:** 0.045  
**MRL:** 0.100

Method Blanks are spiked synthetic ground water solutions that have undergone the tumbling process along with the client samples. There are eight (8) distinct synthetic groundwater solutions, as described in the table below.

| Sample ID | Synthetic GW pH Control                              | Soil:Solution Ratio, Equilibration Time            | Arsenic Spikes Used in Synthetic GW |
|-----------|--|--|-------------------------------------|
| BLK1      | No Buffer Used in Synthetic GW,<br>TDS ≈ 23,000 mg/L | 1:10 Solution Ratio, 72 hrs.<br>Equilibration Time | 0.4 mg/L As(III)                    |
| BLK2      |  |  | 1 mg/L As(III)                      |
| BLK3      |  |  | 5 mg/L As (III)                     |
| BLK4      |  |  | 20 mg/L As (III)                    |
| BLK5      |  |  | 0.4 mg/L As(V)                      |
| BLK6      |  |  | 1 mg/L As(V)                        |
| BLK7      |  |  | 5 mg/L As (V)                       |
| BLK8      |  |  | 20 mg/L As (V)                      |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Method Blanks & Reporting Limits

**Batch:** B180926  
**Matrix:** Soil/Sediment  
**Method:** SM 2540G  
**Analyte:** %TS

| Sample       | Result               | Units |                   |
|--------------|----------------------|-------|-------------------|
| B180926-BLK1 | 0.01                 | %     |                   |
| B180926-BLK2 | 0.01                 | %     |                   |
|              | <b>Average:</b> 0.01 |       | <b>MDL:</b> 0.004 |
|              | <b>Limit:</b> 0.01   |       | <b>MRL:</b> 0.01  |



## Method Blanks & Reporting Limits

**Batch:** B181065  
**Matrix:** Water  
**Method:** EPA 1638 Mod  
**Analyte:** As(BAT)

| Sample       | Result | Units |
|--------------|--------|-------|
| B181065-BLK1 | 401    | µg/L  |
| B181065-BLK2 | 977    | µg/L  |
| B181065-BLK3 | 4670   | µg/L  |
| B181065-BLK4 | 18600  | µg/L  |
| B181065-BLK5 | 453    | µg/L  |
| B181065-BLK6 | 1120   | µg/L  |
| B181065-BLK7 | 5260   | µg/L  |
| B181065-BLK8 | 20800  | µg/L  |

**MDL:** 4.50  
**MRL:** 10.0

Method Blanks are spiked synthetic ground water solutions that have undergone the tumbling process along with the client samples. There are eight (8) distinct synthetic groundwater solutions, as described in the table below.

| Sample ID | Synthetic GW pH Control                              | Soil:Solution Ratio, Equilibration Time            | Arsenic Spikes Used in Synthetic GW |
|-----------|--|--|-------------------------------------|
| BLK1      | No Buffer Used in Synthetic GW,<br>TDS ≈ 23,000 mg/L | 1:10 Solution Ratio, 72 hrs.<br>Equilibration Time | 0.4 mg/L As(III)                    |
| BLK2      |  |  | 1 mg/L As(III)                      |
| BLK3      |  |  | 5 mg/L As (III)                     |
| BLK4      |  |  | 20 mg/L As (III)                    |
| BLK5      |  |  | 0.4 mg/L As(V)                      |
| BLK6      |  |  | 1 mg/L As(V)                        |
| BLK7      |  |  | 5 mg/L As (V)                       |
| BLK8      |  |  | 20 mg/L As (V)                      |





## Method Blanks & Reporting Limits

**Batch:** B181075  
**Matrix:** Water  
**Method:** EPA 150.1  
**Analyte:** pH

| Sample       | Result | Units       |
|--------------|--------|-------------|
| B181075-BLK1 | 4.49   | pH units we |
| B181075-BLK2 | 4.71   | pH units we |
| B181075-BLK3 | 8.39   | pH units we |
| B181075-BLK4 | 9.30   | pH units we |
| B181075-BLK5 | 4.62   | pH units we |
| B181075-BLK6 | 4.57   | pH units we |
| B181075-BLK7 | 6.05   | pH units we |
| B181075-BLK8 | 7.00   | pH units we |

Method Blanks are spiked synthetic ground water solutions that have undergone the tumbling process along with the client samples. There are eight (8) distinct synthetic groundwater solutions, as described in the table below.

| Sample ID | Synthetic GW pH Control                              | Soil:Solution Ratio, Equilibration Time            | Arsenic Spikes Used in Synthetic GW |
|-----------|--|--|-------------------------------------|
| BLK1      | No Buffer Used in Synthetic GW,<br>TDS ≈ 23,000 mg/L | 1:10 Solution Ratio, 72 hrs.<br>Equilibration Time | 0.4 mg/L As(III)                    |
| BLK2      |  |  | 1 mg/L As(III)                      |
| BLK3      |  |  | 5 mg/L As (III)                     |
| BLK4      |  |  | 20 mg/L As (III)                    |
| BLK5      |  |  | 0.4 mg/L As(V)                      |
| BLK6      |  |  | 1 mg/L As(V)                        |
| BLK7      |  |  | 5 mg/L As (V)                       |
| BLK8      |  |  | 20 mg/L As (V)                      |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-01                |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-2.0-4.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                               | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-02                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-13.0-15.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-03                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-23.0-25.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

|  |                  |                            |            |                              |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Lab ID:</b> 1809005-04                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/13/2017 |              |           |                    |
| <b>Sample:</b> SO-PTC-002-091317-31.0-33.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/13/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 8 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-05                | <b>Report Matrix:</b> Soil | <b>Collected:</b> 09/15/2017 |         |              |       |    |                    |
|--|----------------------------|------------------------------|---------|--------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-2.5-4.5 | <b>Sample Type:</b> Sample | <b>Received:</b> 09/15/2017  |         |              |       |    |                    |
| Des                                      | Container                  | Size                         | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE                   | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL                  | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-06                  | <b>Report Matrix:</b> Soil | <b>Collected:</b> 09/15/2017 |         |              |       |    |                    |
|--|----------------------------|------------------------------|---------|--------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-11.5-13.5 | <b>Sample Type:</b> Sample | <b>Received:</b> 09/15/2017  |         |              |       |    |                    |
| Des  | Container                  | Size                         | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE                   | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL                  | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-07                  | <b>Report Matrix:</b> Soil | <b>Collected:</b> 09/15/2017 |         |              |       |    |                    |
|--|----------------------------|------------------------------|---------|--------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-23.0-25.0 | <b>Sample Type:</b> Sample | <b>Received:</b> 09/15/2017  |         |              |       |    |                    |
| Des  | Container                  | Size                         | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE                   | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL                  | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-08                  | <b>Report Matrix:</b> Soil | <b>Collected:</b> 09/15/2017 |         |              |       |    |                    |
|--|----------------------------|------------------------------|---------|--------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-001-091517-31.5-33.5 | <b>Sample Type:</b> Sample | <b>Received:</b> 09/15/2017  |         |              |       |    |                    |
| Des  | Container                  | Size                         | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE                   | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B  | EXTRA_VOL                  | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

| <b>Lab ID:</b> 1809005-09                  | <b>Report Matrix:</b> Soil | <b>Collected:</b> 09/20/2017 |         |              |       |    |                    |
|--|----------------------------|------------------------------|---------|--------------|-------|----|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-10.0-12.0 | <b>Sample Type:</b> Sample | <b>Received:</b> 09/21/2017  |         |              |       |    |                    |
| Des  | Container                  | Size                         | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE                   | 8oz                          | 17-0058 | None         | n/a   |    | Cooler 3 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-10                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-17.3-20.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

| <b>Lab ID:</b> 1809005-11                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-22.5-25.0 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

| <b>Lab ID:</b> 1809005-12                  |                  | <b>Report Matrix:</b> Soil |            | <b>Collected:</b> 09/20/2017 |              |           |                    |
|--|------------------|----------------------------|------------|------------------------------|--------------|-----------|--------------------|
| <b>Sample:</b> SO-PTC-129-092017-35.8-36.5 |                  | <b>Sample Type:</b> Sample |            | <b>Received:</b> 09/21/2017  |              |           |                    |
| <b>Des</b>                                 | <b>Container</b> | <b>Size</b>                | <b>Lot</b> | <b>Preservation</b>          | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |
| B  | EXTRA_VOL        | 8oz                        | 17-0058    | None                         | n/a          |           | Cooler 3 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-13           |                   |             | <b>Report Matrix:</b> Water-D |                     |              | <b>Collected:</b> 09/21/2017 |                    |
|-------------------------------------|-------------------|-------------|-------------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> GW-713-2-092117-(20) |                   |             | <b>Sample Type:</b> Sample    |                     |              | <b>Received:</b> 09/21/2017  |                    |
| <b>Des</b>                          | <b>Container</b>  | <b>Size</b> | <b>Lot</b>                    | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| B                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| C                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| D                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| E                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 4 - 1809005 |
| F                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| G                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| H                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| I                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |
| J                                   | Bottle HDPE ICP-W | 8oz         | 17-0058                       | None                | n/a          |                              | Cooler 5 - 1809005 |

| <b>Lab ID:</b> 1809005-14                    |                  |             | <b>Report Matrix:</b> Soil |                     |              | <b>Collected:</b> 10/03/2017 |                    |
|--|------------------|-------------|----------------------------|---------------------|--------------|------------------------------|--------------------|
| <b>Sample:</b> SO-122+60-0-SED-100317-0-0.33 |                  |             | <b>Sample Type:</b> Sample |                     |              | <b>Received:</b> 10/03/2017  |                    |
| <b>Des</b>                                   | <b>Container</b> | <b>Size</b> | <b>Lot</b>                 | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b>                    | <b>Ship. Cont.</b> |
| A  | Jar HDPE         | 8oz         | 17-0058                    | None                | n/a          |                              | Cooler 6 - 1809005 |
| B  | EXTRA_VOL        | 8oz         | 17-0058                    | None                | n/a          |                              | Cooler 6 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

| <b>Lab ID:</b> 1809005-15                    |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/03/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-125+50-0-SED-100317-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/03/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 6 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 6 - 1809005 |

| <b>Lab ID:</b> 1809005-16                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-120+75-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |

| <b>Lab ID:</b> 1809005-17                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-125+00-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |

| <b>Lab ID:</b> 1809005-18                      |           | <b>Report Matrix:</b> Soil |         | <b>Collected:</b> 10/04/2017 |       |    |                    |
|--|-----------|----------------------------|---------|------------------------------|-------|----|--------------------|
| <b>Sample:</b> SO-128+50-ST1-SED-100417-0-0.33 |           | <b>Sample Type:</b> Sample |         | <b>Received:</b> 10/06/2017  |       |    |                    |
| Des  | Container | Size                       | Lot     | Preservation                 | P-Lot | pH | Ship. Cont.        |
| A  | Jar HDPE  | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |
| B  | EXTRA_VOL | 8oz                        | 17-0058 | None                         | n/a   |    | Cooler 7 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-19      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 0.4 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-20      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 1 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-21      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 5 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-22      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 20 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-23      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-24      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
1 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-25      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
5 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-26      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
20 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |





## Sample Containers

**Lab ID:** 1809005-27      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 0.4 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-28      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 1 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-29      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 5 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-30      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_No Buff, 20 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-31      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-32      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
1 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-33      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
5 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-34      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-23.0-25.0\_With Buff,      **Sample Type:** Sample  
20 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

Project ID: PTC-OA1701-4  
PM: Jeremy Maute



BAL Report 1809005 Round 4.2  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

Lab ID: 1809005-35      Report Matrix: Soil      Collected: 09/15/2017  
Sample: SO-PTC-001-091517-23.0-25.0\_With Buff,      Sample Type: Sample      Received: 09/15/2017  
20 mg/L As(III)

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.           |
|-----|-----------|------|---------|--------------|-------|----|-----------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 -<br>1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 -<br>1809005 |

Lab ID: 1809005-36      Report Matrix: Soil      Collected: 09/13/2017  
Sample: SO-PTC-002-091317-23.0-25.0\_With Buff,      Sample Type: Sample      Received: 09/13/2017  
0.4 mg/L As(III)

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.           |
|-----|-----------|------|---------|--------------|-------|----|-----------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 -<br>1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 -<br>1809005 |

Lab ID: 1809005-37      Report Matrix: Soil      Collected: 09/13/2017  
Sample: SO-PTC-002-091317-23.0-25.0\_With Buff,      Sample Type: Sample      Received: 09/13/2017  
1 mg/L As(III)

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.           |
|-----|-----------|------|---------|--------------|-------|----|-----------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 -<br>1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 -<br>1809005 |

Lab ID: 1809005-38      Report Matrix: Soil      Collected: 09/13/2017  
Sample: SO-PTC-002-091317-23.0-25.0\_With Buff,      Sample Type: Sample      Received: 09/13/2017  
5 mg/L As(III)

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.           |
|-----|-----------|------|---------|--------------|-------|----|-----------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 -<br>1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 -<br>1809005 |

Project ID: PTC-OA1701-4  
PM: Jeremy Maute



BAL Report 1809005 Round 4.2  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-39      **Report Matrix:** Soil  
**Sample:** SO-PTC-002-091317-23.0-25.0\_With Buff, 20 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/13/2017  
**Received:** 09/13/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 8 - 1809005 |

**Lab ID:** 1809005-40      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 0.4 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-41      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 1 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-42      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 5 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

Project ID: PTC-OA1701-4  
PM: Jeremy Maute



BAL Report 1809005 Round 4.2  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-43      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 20 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-44      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 0.4 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-45      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 1 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-46      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 5 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-47      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-2.5-4.5\_With Buff, 20 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-48      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff, 0.4 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-49      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff, 1 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-50      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff, 5 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |



## Sample Containers

**Lab ID:** 1809005-51      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff,      **Sample Type:** Sample  
20 mg/L As(III)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-52      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff,      **Sample Type:** Sample  
0.4 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-53      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff,      **Sample Type:** Sample  
1 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-54      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff,      **Sample Type:** Sample  
5 mg/L As(V)      **Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

Project ID: PTC-OA1701-4  
PM: Jeremy Maute



BAL Report 1809005 Round 4.2  
Client PM: Troy Bussey Jr.  
Client Project: Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-55      **Report Matrix:** Soil  
**Sample:** SO-PTC-001-091517-11.5-13.5\_With Buff, 20 mg/L As(V)      **Sample Type:** Sample  
**Collected:** 09/15/2017  
**Received:** 09/15/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 2 - 1809005 |

**Lab ID:** 1809005-56      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No Buff, 0.4 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-57      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No Buff, 1 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-58      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No Buff, 5 mg/L As(III)      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |



**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-59      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-60      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-61      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-62      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-63      **Report Matrix:** Soil  
**Sample:** SO-122+60-0-SED-100317-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/03/2017  
**Received:** 10/03/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 6 - 1809005 |

**Lab ID:** 1809005-64      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-65      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-66      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-67      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-68      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-69      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Lab ID:** 1809005-70      **Report Matrix:** Soil  
**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No      **Sample Type:** Sample  
**Collected:** 10/04/2017  
**Received:** 10/06/2017

| Des | Container | Size | Lot     | Preservation | P-Lot | pH | Ship. Cont.        |
|-----|-----------|------|---------|--------------|-------|----|--------------------|
| A   | Jar HDPE  | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |
| B   | EXTRA_VOL | 8oz  | 17-0058 | None         | n/a   |    | Cooler 7 - 1809005 |

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Sample Containers

**Lab ID:** 1809005-71

**Sample:** SO-125+00-ST1-SED-100417-0-0.33\_No  
Buff, 20 mg/L As(V)

**Report Matrix:** Soil  
**Sample Type:** Sample

**Collected:** 10/04/2017  
**Received:** 10/06/2017

|   | <b>Des Container</b> | <b>Size</b> | <b>Lot</b> | <b>Preservation</b> | <b>P-Lot</b> | <b>pH</b> | <b>Ship. Cont.</b>    |
|---|----------------------|-------------|------------|---------------------|--------------|-----------|-----------------------|
| A | Jar HDPE             | 8oz         | 17-0058    | None                | n/a          |           | Cooler 7 -<br>1809005 |
| B | EXTRA_VOL            | 8oz         | 17-0058    | None                | n/a          |           | Cooler 7 -<br>1809005 |



## Shipping Containers

### Cooler 2 - 1809005

Received: September 15, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: -11.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? Yes  
Custody seals intact? Yes  
COC present? Yes

### Cooler 3 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: -19.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #13

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 4 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Ice  
Temperature: 15.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #10

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 5 - 1809005

Received: September 21, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Ice  
Temperature: 14.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #10

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 6 - 1809005

Received: October 3, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 1.0 °C

Description: Cooler 6  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 7 - 1809005

Received: September 15, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 2.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

### Cooler 7 - 1809005

Received: October 6, 2017 14:00  
Tracking No: n/a via Courier  
Coolant Type: Dry Ice  
Temperature: 2.0 °C

Description: Cooler  
Damaged in transit? No  
Returned to client? No  
Comments: IR #14

Custody seals present? No  
Custody seals intact? No  
COC present? Yes

**Project ID:** PTC-OA1701-4  
**PM:** Jeremy Maute



BAL Report 1809005 Round 4.2  
**Client PM:** Troy Bussey Jr.  
**Client Project:** Arkema FS Data Gap Investigation

## Shipping Containers

### **Cooler 8 - 1809005**

**Received:** September 13, 2017 14:00  
**Tracking No:** n/a via Courier  
**Coolant Type:** Blue ice  
**Temperature:** 12.0 °C

**Description:** Cooler  
**Damaged in transit?** No  
**Returned to client?** No  
**Comments:** IR #8

**Custody seals present?** No  
**Custody seals intact?** No  
**COC present?** Yes



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466 / *LUKE KERNER*

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *[Signature]* For BAL use only Date: 9/13/17

Work Order ID: \_\_\_\_\_ Time: 1400

Project ID: \_\_\_\_\_

Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_  
Port of Tacoma  
PO Box 1537  
Tacoma, WA 98401-1537 Troy Bussey PIONEER  
5205 Corporate Center, Cl. St. Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes

BAL PM: Jeremy Maute

| Requested TAT<br>(business days)                  | Collection                              |                    | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments     |
|---|---|--------------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|--------------|
|   | Date                                    | Time               | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |              |
| <input checked="" type="checkbox"/> 20 (standard) | *Surcharges may apply to expedited TATs |                    |                           |                      |                 |                   |  |   |   |   |   |   |  |              |
| <input type="checkbox"/> 15*                      | Sample ID                               |                    |                           |                      |                 |                   |  |   |   |   |   |   |  |              |
| <input type="checkbox"/> 10*                      | 1                                       | 9/13/17 8:30       | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  | Specify Here |
| <input type="checkbox"/> 5*                       | 2                                       | 9/13/17 8:40       | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |              |
| <input type="checkbox"/> Other _____              | 3                                       | 9/13/17 8:50       | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |              |
|   | 4                                       | 9/13/17 9:20       | SOIL                      | 1                    |                 |                   |  |   | X   |   |   |   |  |              |
|   | <del>5</del>                            | <del>9/13/17</del> | <del>SOIL</del>           | <del>1</del>         |                 |                   |  |   |   |   |   |   |  |              |
|   | <del>6</del>                            | <del>9/13/17</del> | <del>SOIL</del>           | <del>1</del>         |                 |                   |  |   |   |   |   |   |  |              |
|   | 7                                       |                    |                           |                      |                 |                   |  |   |   |   |   |   |  |              |
|   | 8                                       |                    |                           |                      |                 |                   |  |   |   |   |   |   |  |              |
|   | 9                                       |                    |                           |                      |                 |                   |  |   |   |   |   |   |  |              |
|   | 10                                      |                    |                           |                      |                 |                   |  |   |   |   |   |   |  |              |
|   | Trip Blank (specify)                    |                    |                           |                      |                 |                   |  |   |   |   |   |   |  |              |
| Relinquished By: <i>[Signature]</i>               | Date: 9/13/17                           | Time: 1300         | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |  |              |
| Received By: <i>[Signature]</i>                   | Date: 9/13/17                           | Time: 1303         | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |  |              |

Page 1 of 1 List Hazardous Contaminants: \_\_\_\_\_

**Print**





# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com

Samples Collected By: DG Cooper (DOF) 206-660-3466 / *dgcooper*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Lauren Miller* For BAL use only Date: 9/15/17  
 Work Order ID: \_\_\_\_\_ Time: 1630  
 Project ID: \_\_\_\_\_

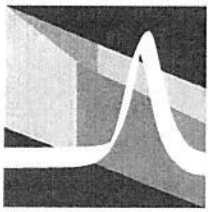
Mail Invoice to: \_\_\_\_\_ Mail Report to: \_\_\_\_\_  
18804 North Creek Parkway, Suite 100, Bothell, WA 98011-3127  
 Troy Bussey (PIONEER)  
 360-570-1700  
 tbussey@uspioneer.com

Email Receipt Confirmation? Yes  
 BAL PM: **Jeremy Maute**

| Requested TAT (business days)  | Collection                              |                    | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |              |
|--|---|--------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|--------------|
|  | Date                                    | Time               | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |              |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Sample ID                               |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 1  | J0-PTC-101-091417-8.2-10.2              | 9/14/17            | 1350                            | SOIL                 | 1               |                   | X  | X   |   |   |   |   |  |          |                                      | Specify Here |
| 2  | J0-PTC-101-091417-19.3-20.3             | 9/14/17            | 1405                            | SOIL                 | 1               |                   | X  | X   |   |   |   |   |  |          |                                      |              |
| 3  | J0-PTC-001-091517-2.5-4.5               | 9/15/17            | 11:50                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 4  | J0-PTC-001-091517-11.5-13.5             | 9/15/17            | 12:00                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 5  | J0-PTC-001-091517-23.0-25.0             | 9/15/17            | 12:20                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 6  | J0-PTC-001-091517-31.5-33.5             | 9/15/17            | 11:20                           | SOIL                 | 1               |                   |  |   | X   |   |   |   |  |          |                                      |              |
| 7  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 8  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 9  |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| 10   |   |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
|  | Trip Blank (specify)                    |                    |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |
| Relinquished By: <i>Lauren Miller</i>  | Date: <del>9/14/17</del> <i>9/15/17</i> | Time: <i>12:35</i> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |                                      |              |
| Received By: <i>Armando Amato</i>  | Date: <i>9.15.17</i>                    | Time: <i>12:35</i> | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |              |







**BROOKS  
APPLIED  
LABS**

# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466 / *L. Kerner*  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: *Lawson* For BAL Use Only BAL Report 1809005 Round 4.2  
 Date: *9/21/17*  
 Work Order ID: \_\_\_\_\_ Time: *9:10*  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection                         |                     | Client Sample Info        |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|------------------------------------|---------------------|---------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                               | Time                | Matrix Type               | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs | Sample ID                          |                     |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 1   | <i>SO-PTC-129-092017-10.0-12.0</i> | <i>9/20/17 1315</i> | <i>SOIL</i>               | <i>1</i>             |                 |                   | <i>X</i>   | <i>X</i>  | <i>X</i>  |   |   |   |  |          | <i>Specify Here</i>                  |
| 2   | <i>SO-PTC-129-092017-17.3-20.0</i> | <i>9/20/17 1320</i> | <i>SOIL</i>               | <i>1</i>             |                 |                   |  |   | <i>X</i>  |   |   |   |  |          |                                      |
| 3   | <i>SO-PTC-129-092017-22.5-25.0</i> | <i>9/20/17 1325</i> | <i>SOIL</i>               | <i>1</i>             |                 |                   | <i>X</i>   | <i>X</i>  | <i>X</i>  |   |   |   |  |          |                                      |
| 4   | <i>SO-PTC-129-092017-35.8-36.5</i> | <i>9/20/17 1500</i> | <i>SOIL</i>               | <i>1</i>             |                 |                   |  |   | <i>X</i>  |   |   |   |  |          |                                      |
| 5   |                                    |                     |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 6   |                                    |                     |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 7   |                                    |                     |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 8   |                                    |                     |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 9   |                                    |                     |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 10  |                                    |                     |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
|   | Trip Blank (specify)               |                     |                           |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <i>[Signature]</i>   | Date: <i>9/21/17</i>               | Time: <i>9:10</i>   | Relinquished By:          |                      |                 |                   | Date:  | Time:   |   |   |   |   |  |          |                                      |
| Received By: <i>[Signature]</i>   | Date: <i>9/21/17</i>               | Time: <i>9:10</i>   | Total Number of Packages: |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |

Page \_\_\_\_ of \_\_\_\_ List Hazardous Contaminants: \_\_\_\_\_

samples@brooksupplied.com | brooksupplied.com

**Print**



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

BAL Report 1809005 Round 4.2

Received by: Jo Walk For BAL use only Date: 9/21/17  
Work Order ID: \_\_\_\_\_ Time: 14:11  
Project ID: \_\_\_\_\_

Client: Pioneer Technologies PO Number: 79227 Mailing Address: \_\_\_\_\_  
Contact: Troy Bursey (burseyt@uspioneer.com) Phone: 360-570-1700  
Client Project ID: Arkema FSDG Inv Email: Burseyt@uspioneer.com Email Receipt Confirmation? (Yes/No) \_\_\_\_\_  
Samples Collected By: L. Hank 2083167223 BAL PM: \_\_\_\_\_

| Requested TAT<br>(business days)<br><input type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br><small>*Surcharges may apply to expedited TATs</small> | Collection |                             | Client Sample Info |                      |                             |   | BAL Analyses Required |                     |                            |   |   |            |   | Comments        |  |
|---|------------|-----------------------------|--------------------|----------------------|-----------------------------|---|-----------------------|---------------------|----------------------------|---|---|------------|---|-----------------|--|
|   | Date       | Time                        | Matrix Type        | Number of Containers | Field Filtered?<br>(Yes/No) | Preservation Type<br>HCl /HNO <sub>3</sub> /Other | Total Hg, EPA 1631    | Methyl Hg, EPA 1630 | ICP-MS Metals<br>(specify) | As Species (specify)<br>InOrg, III, V, MMA, DMA | Se Species (specify)<br>Se(IV), Se(VI), SeCN, Unknown | Filtration | Other (specify)<br>Unimpacted Groundwater for Batch<br>Absorption Tests | Other (specify) | Specify Here   |
|   | Sample ID  |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 1          | <u>GW-713-2-092117-(20)</u> | <u>9/21/17</u>     | <u>1145</u>          | <u>WATER</u>                | <u>9-22</u><br><u>-16</u>                         | <u>Yes</u>            |                     |                            |   |   |            | <input checked="" type="checkbox"/>                                     |                 | <u>Unimpacted Groundwater for Batch Absorption Tests</u> |
|   | 2          |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 3          |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 4          |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 5          |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 6          |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 7          |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 8          |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 9          |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | 10         |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |
|   | Trip Blank |                             |                    |                      |                             |   |                       |                     |                            |   |   |            |   |                 |  |

Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Relinquished By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_  
Received By: \_\_\_\_\_ Date: \_\_\_\_\_ Time: \_\_\_\_\_ Total Number of Packages: 2



# Chain-of-Custody Form

Ship samples to:  
 18804 North Creek Parkway, Suite 100  
 Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466  
 Special Instructions: Lab anoxic preservation for soil/sediment samples.  
 Submit EDD to PIONEER using PIONEER EDD Format.

Received by: Lawson For BAL use only Date: 10/3/17  
 Work Order ID: 1737058 Time: 1310  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
 PO Box 1837  
 Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
 5205 Corporate Center Ct. SE, Ste A  
 Olympia, WA 98503  
 Email Receipt Confirmation? Yes  
 BAL PM: Jeremy Maute

| Requested TAT<br>(business days)  | Collection           |                   | Client Sample Info              |                      |                 |                   | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|---|----------------------|-------------------|---------------------------------|----------------------|-----------------|-------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|   | Date                 | Time              | Matrix Type                     | Number of Containers | Field Filtered? | Preservation Type | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____<br>*Surcharges may apply to expedited TATs |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Sample ID   |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          | Specify Here                         |
| <del>1 SD-122+60-D-5ED-100317-LK</del>  |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 2 SD-122+60-D-5ED-100317-D-0.33   | 10/3/17              | 10:20             | Soil                            | 1                    | No              |                   |  | X   |   |   |   |   |  |          |                                      |
| 3 SD-125+50-D-5ED-100317-D-0.33   | 10/3/17              | 920               | SOIL                            | 1                    | No              |                   |  | X   |   |   |   |   |  |          |                                      |
| 4   |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 5   |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 6   |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 7   |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 8   |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 9   |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| 10  |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)  |                      |                   |                                 |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Lawson</u>  | Date: <u>10/3/17</u> | Time: <u>1310</u> | Relinquished By: _____          |                      |                 |                   | Date: _____  | Time: _____   |   |   |   |   |  |          |                                      |
| Received By: _____  | Date: _____          | Time: _____       | Total Number of Packages: _____ |                      |                 |                   |  |   |   |   |   |   |  |          |                                      |



# Chain-of-Custody Form

Ship samples to:  
18804 North Creek Parkway, Suite 100  
Bothell, WA 98011

Client: Port of Tacoma (PIONEER/DOF) PO Number: 79224  
 Contact: Troy Bussey (PIONEER) Phone: 360-570-1700  
 Client Project ID: Arkema FS DG Inv Email: busseyt@uspioneer.com  
 Samples Collected By: DG Cooper (DOF) 206-660-3466

Special Instructions: Lab anoxic preservation for soil/sediment samples.  
Submit EDD to PIONEER using PIONEER EDD Format.

For BAL use only BAL Report 1809005 Round 4.2  
 Received by: Jeremy Maute Date: 10/6/17  
 Work Order ID: \_\_\_\_\_ Time: 12:30  
 Project ID: \_\_\_\_\_

Mail Invoice to: Port of Tacoma  
PO Box 1837  
Tacoma, WA 98401-1837  
 Mail Report to: Troy Bussey (PIONEER)  
5205 Corporate Center Ct SE, Ste A  
Olympia, WA 98503

Email Receipt Confirmation? Yes  
BAL PM: Jeremy Maute

| Requested TAT<br>(business days)   | Collection                              |                      | Client Sample Info |                      |                 |                           | BRL Analyses Required  |   |   |   |   |   |  | Comments |                                      |
|--|---|----------------------|--------------------|----------------------|-----------------|---------------------------|--|---|---|---|---|---|--|----------|--------------------------------------|
|  | Date                                    | Time                 | Matrix Type        | Number of Containers | Field Filtered? | Preservation Type         | Solid: Sequential extraction and As, Fe, Al, Mn, Si per Work Plan Table 4-8 (Including Footnote 2) | Solid: Total recoverable As by 6020 for each sequential extraction sample | Solid: Batch adsorption and As and pH per Work Plan Table 4-8 (Including Footnotes 3 and 4) | Water: Total As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved As, Cu, Pb, Ni, and Hg per Work Plan Table 4-7 | Water: Dissolved Arsenate, Arsenite, MMA, and DMA per Work Plan Table 4-7 | Water: Dissolved Fe, Al, Ca, Mg, Mn, K, Si, and Na per Work Plan Table 4-7 |          | Note: Field conductivity measurement |
| <input checked="" type="checkbox"/> 20 (standard)<br><input type="checkbox"/> 15*<br><input type="checkbox"/> 10*<br><input type="checkbox"/> 5*<br><input type="checkbox"/> Other _____ | *Surcharges may apply to expedited TATs |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Sample ID  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          | Specify Here                         |
| 1  | SD-120+75-ST1-SED-100417-0-0.33         | 10/4/17              | 1330               | SOIL                 | 1               |                           |  |   | X   |   |   |   |  |          |                                      |
| 2  | SD-175+00-ST1-SED-100417-1-0.33         | ↓                    | 1430               | SOIL                 | 1               |                           |  |   | X   |   |   |   |  |          |                                      |
| 3  | SD-128+50-ST1-SED-100417-0-0.33         | ↓                    | 1530               | SOIL                 | 1               |                           |  |   | X   |   |   |   |  |          |                                      |
| 4  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 5  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 6  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 7  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 8  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 9  |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| 10   |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Trip Blank (specify)   |   |                      |                    |                      |                 |                           |  |   |   |   |   |   |  |          |                                      |
| Relinquished By: <u>Water</u>  |   | Date: <u>10/6/17</u> |                    | Time:                |                 | Relinquished By:          |  |   |   | Date:   |   | Time:   |  |          |                                      |
| Received By:   |   | Date:                |                    | Time:                |                 | Total Number of Packages: |  |   |   |   |   |   |  |          |                                      |

**Print**